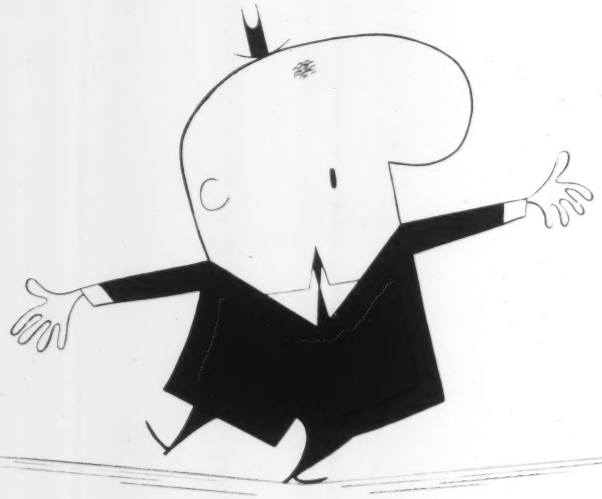
A PROGRAM FOR MANAGEMENT
1958 . . . No. 1

FEBRUARY 17, 1958

STEEL
The Metalworking Weekly

A PENTON PUBLICATION



Balance Your Management

A cause of unbalance is scarcity of good men. Here's how to solve the one postwar shortage that industry hasn't licked . . . . . Page 113

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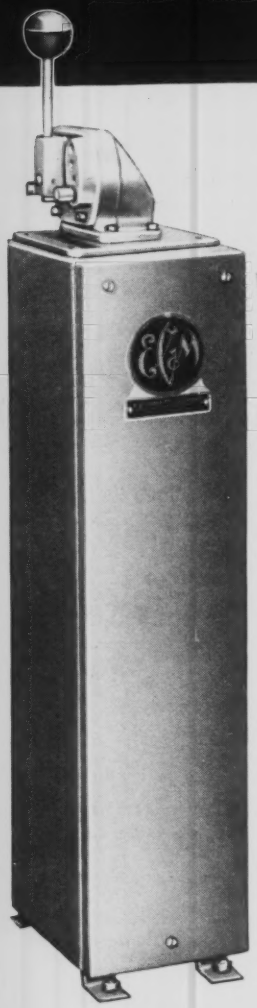
NEW EC&M GIVES YOU VERTICAL MASTER SWITCH REAL FLEXIBILITY!



Built-in Features Make Type VM Best for Many Jobs

MANY FORMS AVAILABLE • Supplied for either right- or left-hand operation—in four sizes to accommodate maximums of 6, 9, 12, and 16 circuits—with or without enclosure.

WIDE VARIETY OF APPLICATIONS • Small size makes it a "natural" for jobs where space is limited—can be mounted adjacent to operator's chair—ideal for air-conditioned crane cabs—for ore bridge installations—for any desk-mounted application.

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Write for Bulletin 9004 VM

TYPE CM MASTER SWITCH

• This service-proven EC&M cam master switch is designed for surface-mounting on all mill, crane, and hoist applications. Narrow width permits close grouping of several master switches within easy reach of the operator.

FOR BASIC STEEL MAKING, IT'S EC&M CONTROL

THE ELECTRIC CONTROLLER & MFG. CO.

A DIVISION OF THE SQUARE D COMPANY

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9813

Now you can fasten almost anything with staples shot from guns

Here they're making staples from a coil of Bethlehem 16-ga galvanized steel wire. Not ordinary office-type staples, but big and sturdy industrial staples, ½ in. to 1⅝ in. long, for fastening gypsum and metal lathing. Staples like this can be driven fast with a portable air-gun weighing only about 5 lb.

What a variety of fastening jobs industry is doing with staples these days! They're fastening crates, boxes, bedding, furniture, flooring, siding, roofing, cabinet work. They're even stapling the ribbing on boats!

Producing the right grades of stapling wire, both galvanized and bright, is a familiar task for our modern wire mills. As a matter of fact, Bethlehem turns out steel wire for just about every imaginable use. Some are general purpose grades; others are tailored to meet the requirements of such products as cold-headed screws, upholstery springs, bicycle spokes, lock washers, brush handles, and armor wire for cables.

The steel wire that's best for your product is likely to be a grade and quality we're producing right now. A Bethlehem representative will gladly give you prices, delivery and other details. Just call or write the Bethlehem sales office nearest you. Your inquiry will receive prompt attention.

BETHLEHEM STEEL COMPANY, BETHLEHEM, PA.

On the Pacific Coast Bethlehem products are sold by Bethlehem Pacific Coast Steel Corporation
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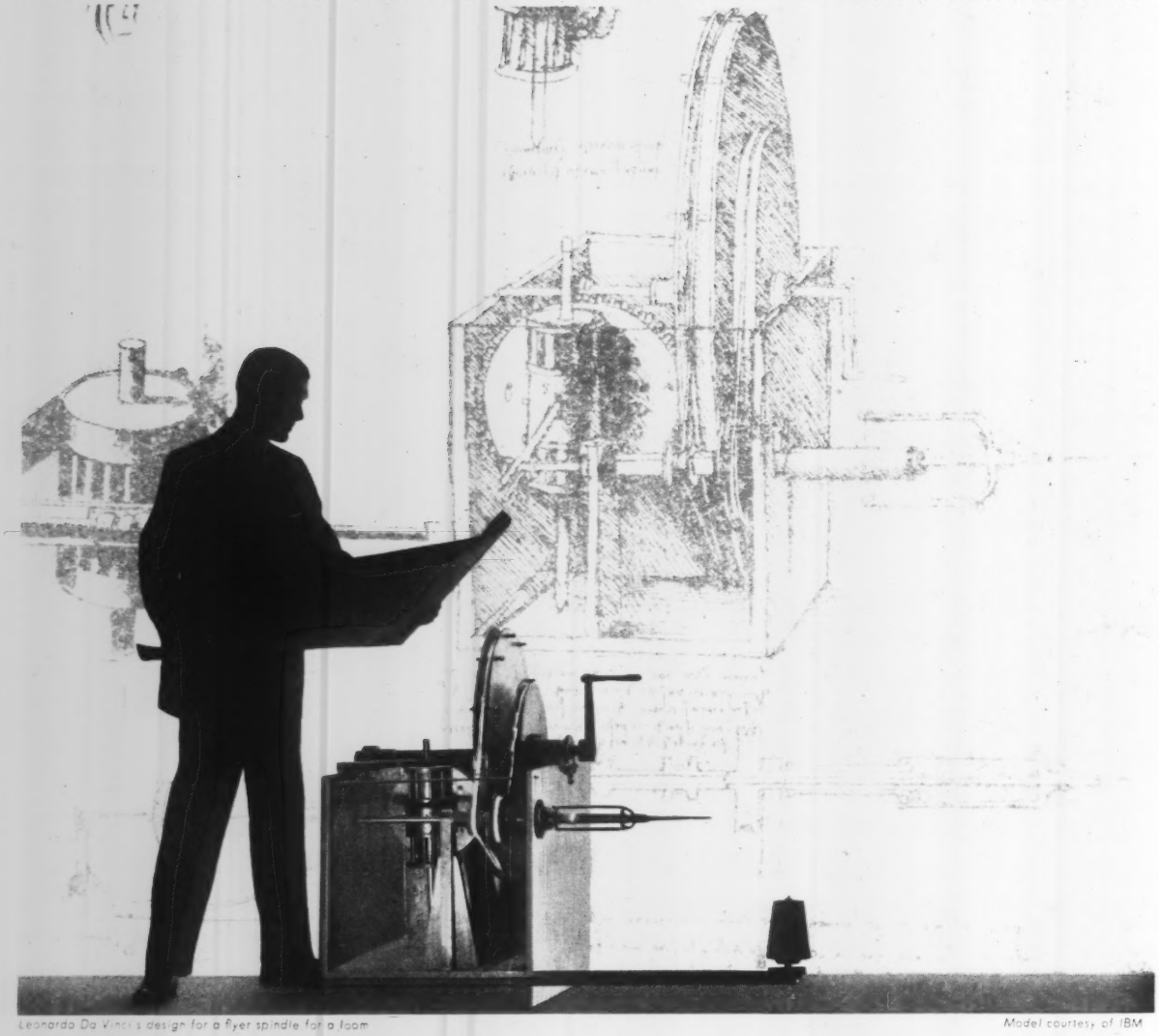
BETHLEHEM STEEL

BETHLEHEM STEEL

creative designing calls for an open mind



Leonardo Da Vinci's design for a flyer spindle for a loom — *Model courtesy of IBM*

EVEN DA VINCI'S DESIGN COULD HAVE BEEN BETTER WITH HELP FROM AN SKF ENGINEER—An SKF engineer never has to push one bearing over another, because SKF makes all four types of ball and roller bearings in over 3,000 sizes. This gives every SKF engineer the kind of flexibility he needs to keep an open mind on any bearing problem. Give your problem to SKF and see.

7812

Spherical, Cylindrical, Ball, and "Tyson" Tapered Roller Bearings

EVERY TYPE—EVERY USE

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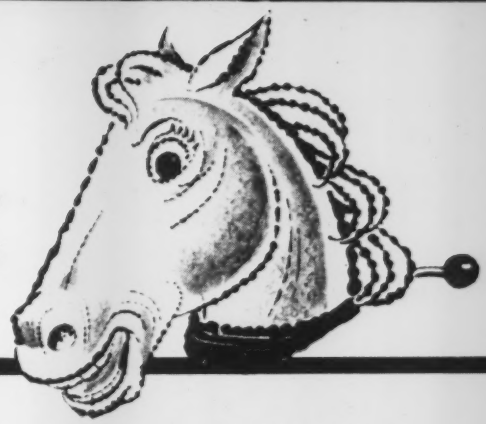
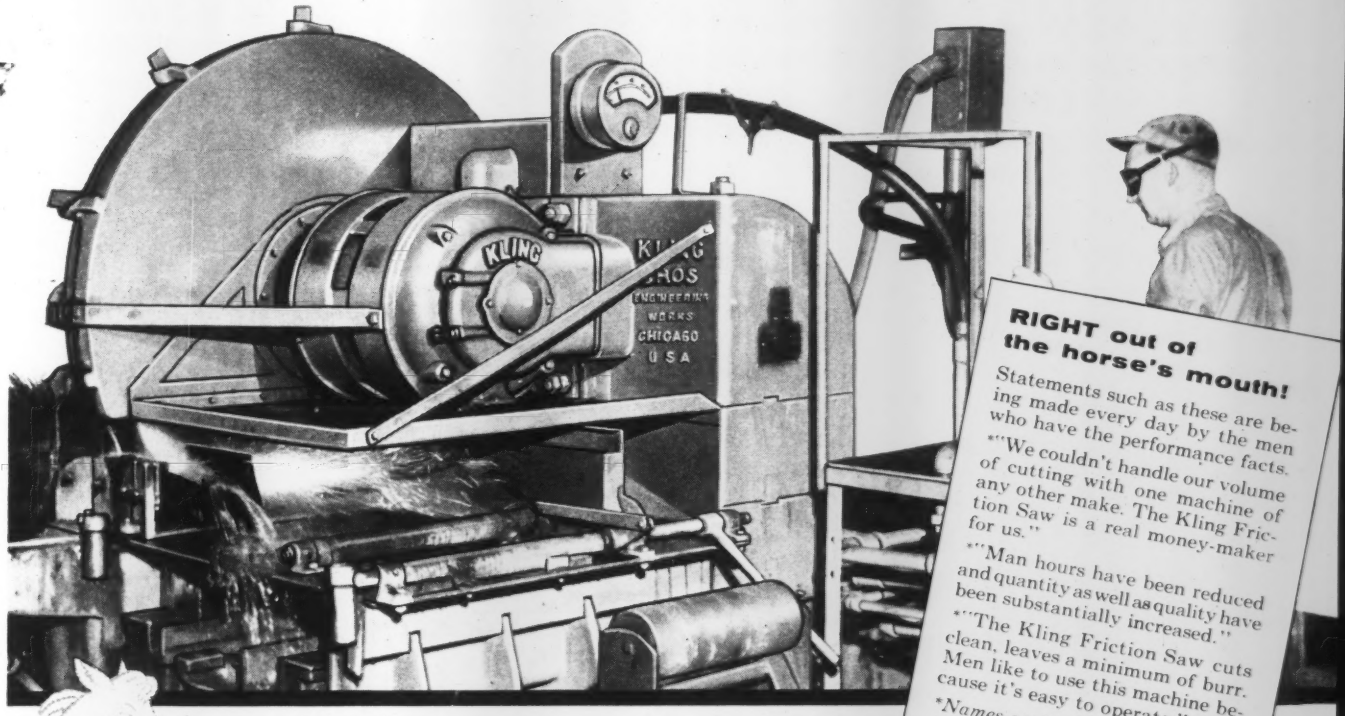
"REG. U.S. PAT. OFF.

Kling Workhorses speak the language production men love to hear!





RIGHT out of the horse's mouth!

Statements such as these are being made every day by the men who have the performance facts.

*"We couldn't handle our volume of cutting with one machine of any other make. The Kling Friction Saw is a real money-maker for us."

*"Man hours have been reduced and quantity as well as quality have been substantially increased."

*"The Kling Friction Saw cuts clean, leaves a minimum of burr. Men like to use this machine because it's easy to operate."

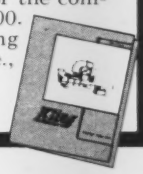
*Names available on request.

*"Increased production 10 TIMES with a Kling friction saw."

"Production sawing of structural steel I-beams, angles, channels, etc. has been increased ten times with a Kling Friction Saw" . . . This statement was relayed to us by a man who had the performance facts—straight from the Workhorse's mouth.

And *men who have the facts* are relaying statements like these *to men who want to know the facts*, straight from the Workhorse's production records . . . All you have to do is ask them!

We will gladly supply you with a complete list of Kling Friction Saw users in your area. Write today . . . ask for a list of users of Kling Friction Saw Workhorses . . . and for the complete technical bulletin #4200. Kling Brothers Engineering Works, 1320 N. Kostner Ave., Chicago 51, Illinois.



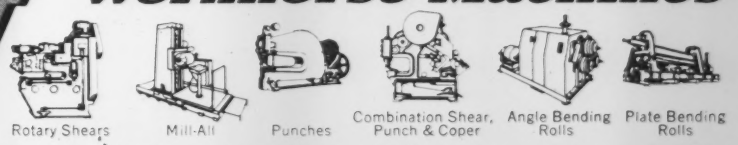
Kling Friction Saw Cuts Structural Steel in Record Time, for example:

Type of Section	Size of Section	Section Area Square Inches	Cutting Time Approx. (Seconds)
	18" x 70 lb.	20.46	10.8
	15" x 50 lb.	14.71	7.6
	30.42 lbs. 3⅜" Dia.	8.95	5.5
	2⅞	8.26	5.5

See the complete data in technical bulletin #4200.

256

Kling Workhorse Machines



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your best belt buy—

by far

A Special tension members of steel cable or exclusive, synthetic Triple-Tempered (3-T) Cords—carefully tempered with Tension, Temperature and Time for maximum strength with minimum stretch.

B Tension and compression sections of mildew-inhibited rubber compounds—designed to the job—and manufactured to team perfectly with whatever type load-carriers are used.

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Clean, Smooth-Running Operation for maximum trouble-free, horsepower hours of operation—lowest possible power transmission costs

—SO NEXT TIME YOU NEED V-BELTS

—be sure you get belts with the Green Seal. See your Goodyear Distributor for details. Or write Goodyear, Industrial Products Division, Lincoln 2, Nebraska, or Akron 16, Ohio.

DIMENSIONALLY STABLE V-BELTS with the GREEN SEAL by

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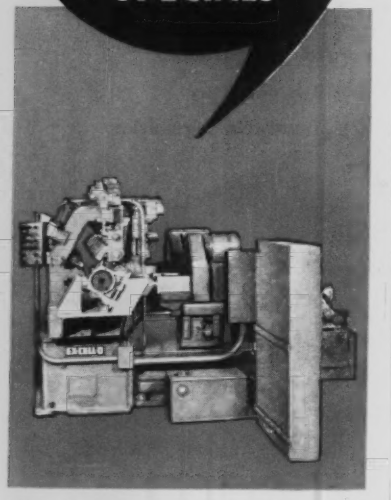
STEP-BY-STEP AUTOMATION WITH EX-CELL-O SPECIALS



Your first step into automation may cost much less than you think. In medium-sized shops, for example, a profitable, automated set-up may involve the purchase of a relatively simple transfer machine, such as the one illustrated above, consisting of two standard way-type units. Or, even more simply, a single standard machine which easily fits into automated set-ups later on.

In any case, a host of Ex-Cell-O engineers, laboratory technicians and production specialists are at your service. *No obligation whatsoever.* Call your Ex-Cell-O Representative or write Ex-Cell-O, Detroit.

SEND FOR FREE BROCHURE

This 20-page catalog will show you the most profitable way to put automation into your present operations—make your own "Automation Appraisal." Ask for Bulletin 50155.

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57-88

EX-CELL-O CORPORATION DETROIT 32, MICHIGAN

behind the scenes

All's Well That Ends Well

Each year, as you may remember, the National Business Paper Publishers assemble with their guests in Washington at a State of the Nation dinner and award a Silver Quill to an outstanding citizen. This year the Silver Quill went to Benjamin F. Fairless, who is as vital to the steel industry as Willie Mays is to baseball. Russell C. Jaenke, executive vice president, Penton Publishing Co. (publisher of STEEL), and chairman of NBP, was master of ceremonies. He introduced Vice President Richard Nixon, who introduced Mr. Fairless, who accepted his new honors with dignity and humor.

The foregoing is the gist, or the nubbin of the story. We were duly impressed with it, but the item that appealed to the perennial gamin in us was properly overlooked by the conscientious press:

The Hon. John Bricker, senior senator from Ohio, graciously accepted an invitation to attend the dinner. When he arrived at the grand ballroom of the Sheraton Park Hotel, 1400 ladies and gentlemen had begun to adjust their napkins; the fashionable signal for "Soup's on!" had been given, and the doors were closed. The senior senator, to his intense astonishment, was locked out! Fortunately, this frightful situation was later repaired to the satisfaction of all concerned. Admittedly, it was rough on Mr. Bricker, but if we are to be perfectly objective, we must consider the delight it brought to the Democrats in attendance. (Perhaps even Sen. Frank J. Lausche, who was also a Penton guest.)

Letters of Note

It's not often that we get an opportunity to go through the mail of Editor-in-Chief Irwin Such; he's still old fashioned enough to believe in the privacy of mail, telephone conversations, and the ballot. This morning, however, his secretary smuggled two of his letters into our coop; we think you may find them interesting. (Other folks's mail usually is.) The first letter is from Dr. Herbert Gross, STEEL's German correspondent and a famous business analyst in his own country. Industries-Kreditbank of Dusseldorf (10 to 1 our printers don't have those two little dots that sit over the "u") asked the Doktor to rush over to America and survey small business. The European Custom Union is expected to create a large market, but nobody knows whether such a large market will favor or retard small business.

"You carried recently in STEEL an interesting story 'Make or Buy?'" he wrote. "I quoted it in *Handelsblatt*" (a German business newspaper) "and it made the rounds of Europe. Who wrote the article, and could I see him on my trip?"

Detroit Editor Don Postma wrote the article, and if he plays his cards right, he might wangle a transfer to der *Handelsblatt*. Nicht wahr, Herr Postma?

Furnace Art

The second letter was an amiable communication from S. H. Reynolds, general sales manager, Great Lakes Carbon Corp., New York. Mr. Reynolds revealed that because his organization worked closely with melt shop personnel, the corporation cooked up an advertising campaign to pay tribute to them. In testimony whereof, Mr. Reynolds enclosed a reproduction of an illustration showing a pair of dedicated electric furnace tenders tending an electric furnace. "If you or your associates would like reproductions of the art used in this series," he wrote, "just say the word. Complimentary copies are also available to your readers."

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(Metalworking Outlook—Page 67

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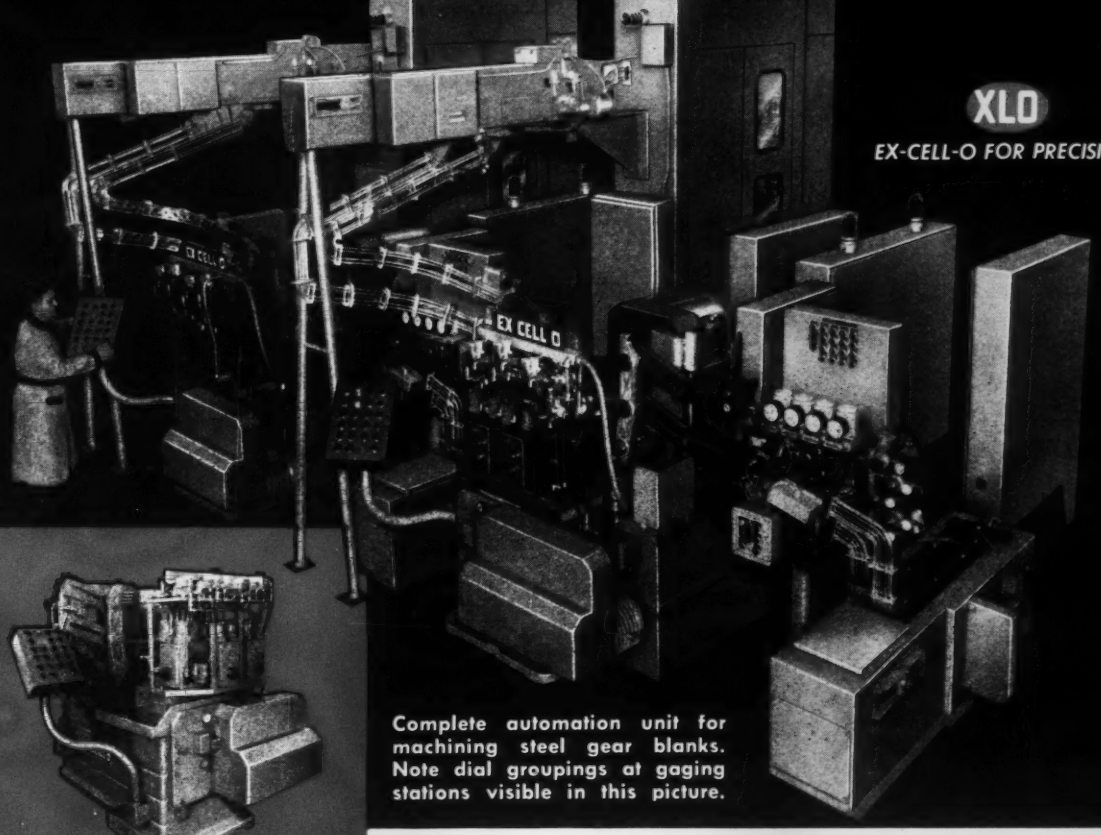
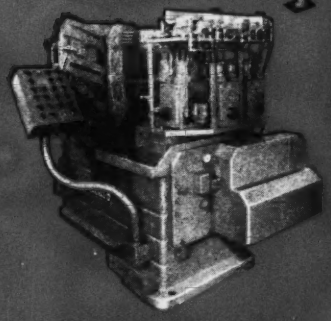
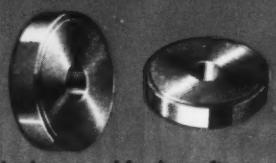
EX-CELL-O FOR PRECISION



Complete automation unit for machining steel gear blanks. Note dial groupings at gaging stations visible in this picture.



Ex-Cell-O Style 312 Cam Boring Machine adapted for automation. Components on cross slide automatically adjust tools to hold specified limits.



Typical gear blanks after automatic machining is completed.

Standard Ex-Cell-O Machines Handle Automatic Operations

Take these cam boring machines, for example: they are standard Ex-Cell-O 312s. When a customer's production schedule called for an unusually high per hour output of steel gear blanks Ex-Cell-O engineers incorporated these machines into an automated setup.

Included in the new setup: two cam-operated Ex-Cell-O Precision Boring Machines, two Gear-O-Mation storage-distribution units, three gaging stations.

The boring machines finish all the surfaces of the gear blanks: face both sides, chamfer both inner and outer edges, bore the central holes and turn the outside diameters. Tools are adjusted automatically to maintain required tolerances. Gage units automatically check parts prior to entering the machining stations, and the storage-distribution units provide space for a bank of parts at each machine station.

If you're interested in automation, but are held back by the high cost of specially designed machine tools, call your nearby Ex-Cell-O Representative today. Perhaps a standard Ex-Cell-O machine tool setup can be adapted to your automatic operation requirements. Or, if you prefer, contact Ex-Cell-O in Detroit directly.

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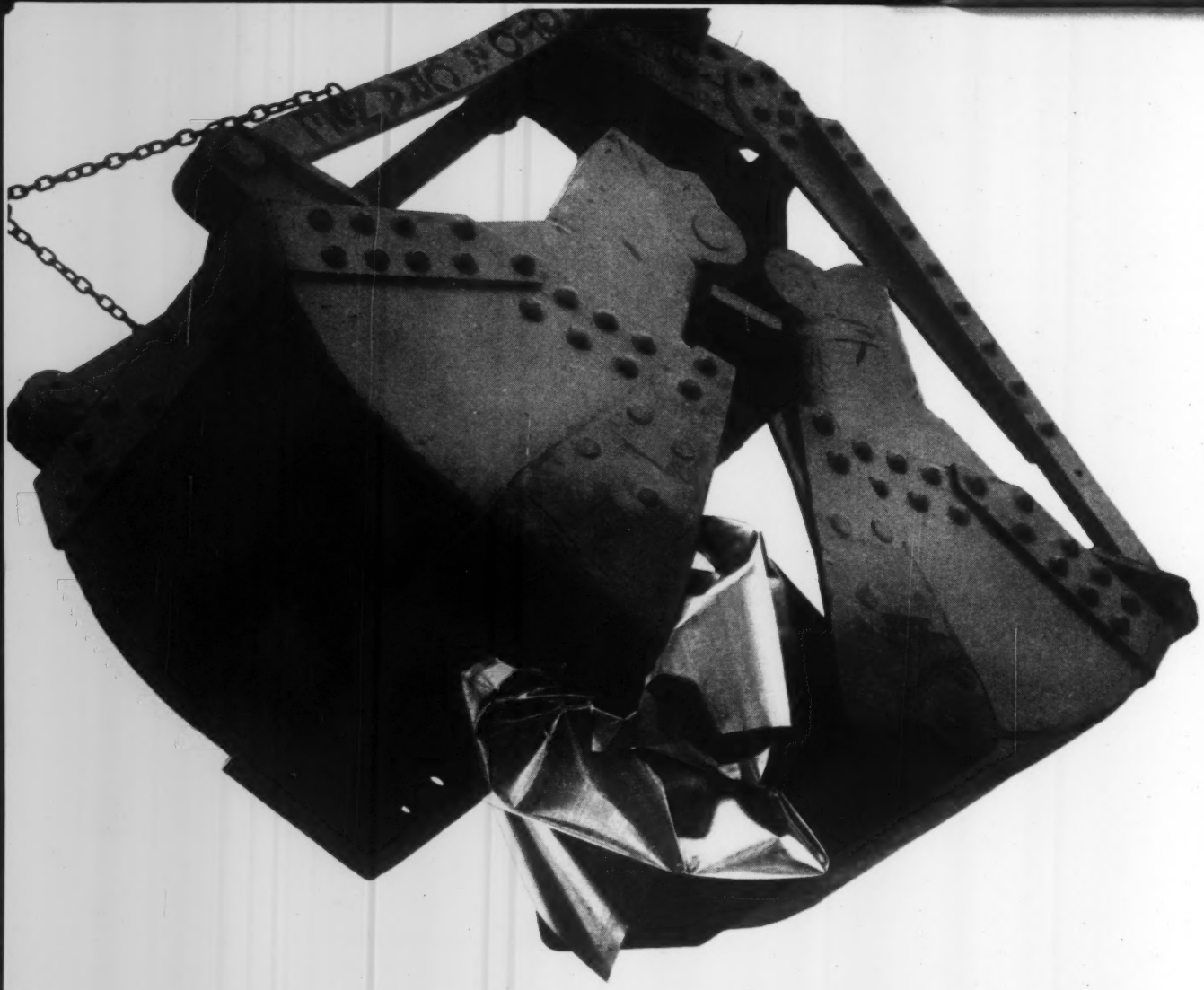

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For brutal, iron-jawed pressure, a steam shovel has few equals. Here, in this crushing grip, Weirkote's zinc coating undergoes a murderous test.

Yet at every crease, at every tortured angle of this crumpled mass, the zinc remains an integral part of the steel. There is not one sign of flaking anywhere!

No wonder strenuous forming operations such as lock seaming are child's play, for Weirkote can be worked to the very limits of the steel itself!

No wonder parts fabricated from it require no painting, plating or redipping to guard against corrosion. Weirkote parts can be stamped, drawn or spun well in advance of use, and stored without danger of rust.

And NOW, Weirkote is treated to inhibit wet storage (white oxide) stain.

Why not find out what Weirkote's benefits can mean to you?

Free Weirkote Booklet! Send for all the facts on Weirkote. Write Weirton Steel Company, Dept. B-6, Weirton, West Virginia

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a division of

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A 3M Case History Report

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MANUFACTURER: Heintz Division of Kelsey-Hayes Co.

ADDRESS: Philadelphia, Pennsylvania.

PRODUCT MANUFACTURED: Automotive Metal Stampings.

3M ABRASIVE USED: "PG" Wheels.

HOW 3M ABRASIVES ARE USED: Finishing operation. Remove die marks, scratches, and other forming defects from cold-rolled carbon steel auto grille bars, prior to plating.

OPERATIONAL DATA ON 3M METHOD: Grit 220 Resin Bond Cloth "PG" Wheel on double-spindle floor lathe with buff-wheel.

OPERATIONAL DATA ON PREVIOUS METHOD: 2-station, 3-step method. 1st, #120 disc; 2nd, set-up wheel; 3rd, buff-wheel.

PROVEN ADVANTAGES OF 3M METHOD: Former 3-step operation reduced to 2 steps; "PG" Wheel and Buff. "PG" Wheel leaves no scratches on work piece; speeds production 10-15%.

OTHER 3M ABRASIVE PRODUCTS IN USE: "Three-M-ite" Resin Bond Cloth Portable "PG" Wheels on hand-grinders are used to remove in-use scratches, other imperfections from dies, without removing them from press. "PG" Wheels replaced hand methods, reduced repair time from 14 hours to 30 minutes.

WANT MORE INFORMATION? Send for free manual, "Modern Metal Finishing with 3M 'PG' Wheels." Write to 3M Co., St. Paul 6, Minn., Dept. GJ-28.

"PG" Wheels are manufactured in U.S.A. by 3M Company, St. Paul 6, Minn. Export: 99 Park Avenue, New York. Canada: London, Ontario

3M Coated Abrasives

"PG" WHEELS

MINNESOTA MINING AND MANUFACTURING COMPANY

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you can get this brilliant finish directly on zinc die castings!

No electroplating--no mechanical finishing!

PART AS CAST

TREATED WITH NEW IRIDITE

NEW IRIDITE (Cast-Zinc-Brite)

brightens zinc die castings by chemical polishing, protects against corrosion

NOW, FOR THE FIRST TIME you can get a brilliant, decorative finish directly on zinc die-cast parts . . . without mechanical finishing, without electroplating! The luster is provided by the *chemical polishing* action of new Iridite (Cast-Zinc-Brite) solution. Even surface blemishes, such as cold shuts, are brightened by this new process. No electrolysis. No special equipment. No specially trained personnel. Just a simple chemical dip for a few seconds and the job is done. And, this new Iridite has been *tested and proved* in production.

CORROSION RESISTANCE, TOO! New Iridite (Cast-Zinc-Brite) provides exceptional corrosion resistance for bright-type chromate finishes . . . also guards against blueing or darkening by eliminating zinc plate formerly required in bright chromate finishing of zinc die castings.

AS A BASE FOR ELECTROPLATING—Lower mechanical finishing costs are possible where plated finishes are *required* since the brightness provided by this new Iridite may be sufficient.

LET US SHOW YOU what Iridite (Cast-Zinc-Brite) can do for you. Send us at least a half-dozen typical zinc die-cast parts for FREE PROCESSING for your own tests and evaluation. Or, for immediate information, call in your Iridite Field Engineer. He's listed under "Plating Supplies" in your classified 'phone book. ***IMPORTANT: when you give us samples for test processing, please be sure to identify the alloy used.***

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LETTERS TO THE EDITORS

Questions Russian Steel Output

The American technical press in writing about Russian iron and steel production so far has left one gap in its information: What are the Russians doing with their steel?

I have spent years in the statistical analysis of the use of metals, and I wonder if your Yearbook estimate of Russian steel production of 56.5 million tons (STEEL, Jan. 6, p. 164) may be higher than the actual production.

Is there any way of analyzing Russia's steel industry which would give us a safer set of figures with which to work?

Robert B. Dickson
President
Dickson Weatherproof Nail Co.
Evanston, Ill.

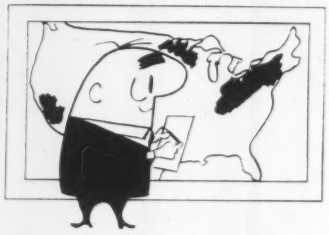
• *The figure came from our London editor who collects foreign steel production figures from contacts built up over several years. We know of no "safe" way to analyze Russian usage, but we suspect it involves a considerable amount of heavy construction—such as railroads, bridges, and buildings.*

Engineering Department To Use

We would appreciate a reprint of your article, "How To Weld Copper and Its Alloys" (STEEL, Jan. 27, p. 86), for use by our engineering department. I would appreciate receiving reprints of the additional articles in the series.

R. E. Glos Jr.
General Manager
Stover Steel Tank & Mfg. Co.
Freeport, Ill.

Steel Consumers Mapped Out



Please send a copy of your fine article, "Where Steel Consumers Are" (STEEL, Jan. 20, p. 46).

Samuel H. Clark
District Engineer
American Institute of Steel Construction Inc.
San Francisco

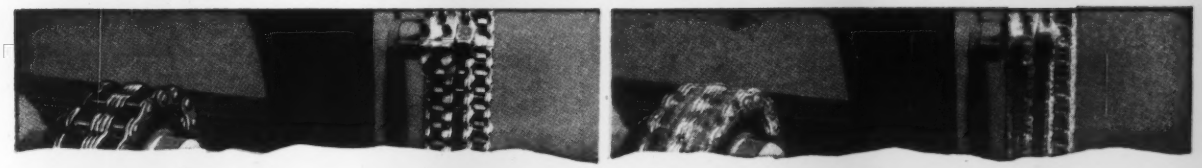
We would be happy to receive three copies. This is a most informative article.

Ray Schryver
Director of Sales
Aetna Freight Lines Inc.
Warren, Ohio

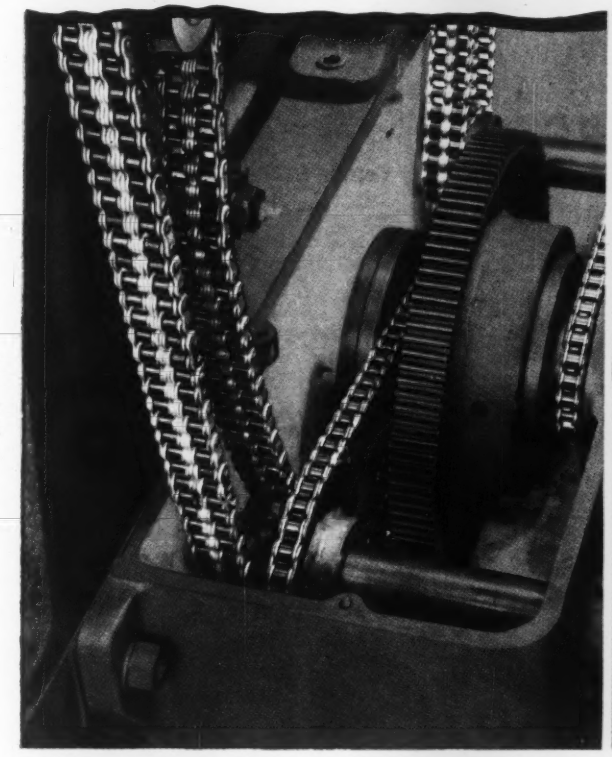
Detection of Leaks

In the Jan. 20 issue, STEEL carried the article, "Fabricating the Redstone Missile" (Page 66). I am interested in the hydrostatic pressure test where fluorescent dye is used and leaks are detected by means of black light. Please direct

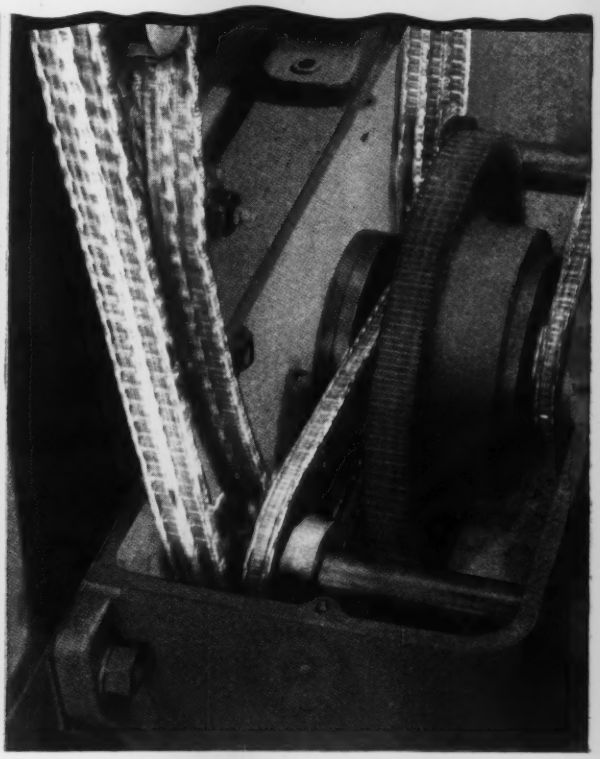
(Please turn to Page 12)



To static strength . . . add *dynamic strength*



RESISTANCE TO TENSILE STRESS is achieved with properly heat-treated, accurately machined side bars made of premium steel and fitted with properly hardened pins, bushings, rollers.



STRENGTH OF CHAIN IN MOTION results from such refinements as pitch-hole preparation, micro-finish of parts, special processing of side bars, pre-lubrication, rigid quality control.

Why LINK-BELT roller chain takes stresses in stride

ON *tough-service* drives and conveyors, Link-Belt precision steel roller chain consistently delivers longer life. That's because its *greater dynamic strength* withstands the starting shock and centrifugal loads of severe operation.

Reports from users prove the effectiveness of Link-Belt's manufacturing extras that add to greater dynamic strength. Shot-peened rollers give greater fatigue life and ability to withstand impact . . . lock-type bushings end a common cause of chain stiffness . . . pre-stressing provides uniform load distribution . . . closer heat-treat control insures uniformity.

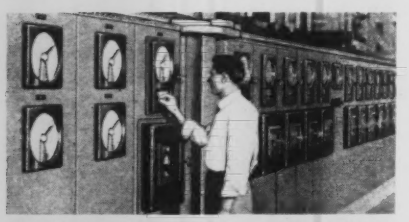
For facts, see your nearby Link-Belt office or authorized stock-carrying distributor. 14.643

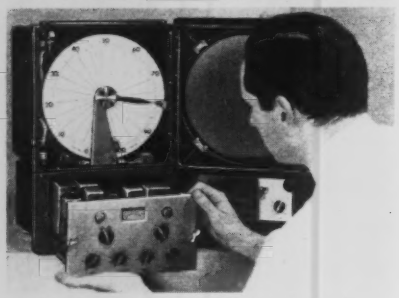
LINK-BELT

ROLLER CHAIN AND SPROCKETS

LINK-BELT COMPANY: Executive Offices, Prudential Plaza, Chicago 1. To Serve Industry There Are Link-Belt Plants, Sales Offices, Stock Carrying Factory Branch Stores and Distributors in All Principal Cities. Export Office: New York 7; Canada, Scarboro (Toronto 13); Australia, Marrickville, N. S. W.; South Africa, Springs. Representatives Throughout the World.

Rubatex gaskets insure tight seal on L & N instruments

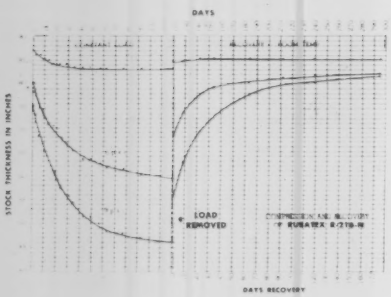




Insures accuracy of L&N Speedomax H Recorder-Controllers as gasketing on instrument doors.

To see Leeds & Northrup instruments . . . on a foundry casting floor taking the guesswork out of pouring temperatures . . . controlling forging temperature and being subjected to severe vibration from 30 steam hammers 24 hours a day, 5 days a week . . . on countless other jobs with a wide variation in temperatures, atmosphere and usage . . . is to realize the important role of RUBATEX CLOSED CELLULAR RUBBER as an effective tight door seal to insure the accuracy of these instruments.

What's more — RUBATEX retains its shape and effective sealing qualities even though instrument doors may be opened daily for many years or sometimes left open to the atmosphere for weeks at a time.



Compression set tests run over a period of 42 weeks show how RUBATEX stocks recovered 92% to 97% of original thickness after dead load was removed—indicating the superior ability of RUBATEX to keep coming back for a longer time and to form a tight, permanent seal.

RUBATEX
CLOSED CELLULAR RUBBER
GASKETS

RUBATEX DIVISION, Dept. S-5
GREAT AMERICAN INDUSTRIES, INC.
Bedford, Virginia

For full details and sample of Rubatex Closed Cellular Rubber Gaskets—print your name in space below, attach to your company letterhead and mail to us.

Name _____

Send for free sample and data sheets

LETTERS

(Concluded from Page 10)

me to a source for more detailed information.

Arnold M. Fox
Pennsylvania Transformer Co. Div.
McGraw Electric Co.
Canonsburg, Pa.

• *Contact Melvin C. Duke, plant manager, Sheffield Plant, Reynolds Metals Co., Sheffield, Ala.*

I have just finished your informative article. Please forward an extra copy.

Taylor Barnes
President
Bar-Brook Mfg. Co. Inc.
Shreveport, La.

Enjoys STEEL's Yearbook Issue

We enjoyed your first 1958 issue of STEEL, dated Jan. 6. The many articles and opinions presented are most satisfying. Please send reprints of the articles, "Marketing Shifts into High Gear" (Page 115) and "Management Expects Sales Volume To Hold at High Level in 1958" (Page 119).

John H. Kelly
Standards Engineer
Hiller Helicopters
Palo Alto, Calif.

Purchaser Seeks Reprint

The article, "Producers Plan a Comeback for Copper" (STEEL, Jan. 13, p. 35), is of great interest to us in the purchasing department. We would appreciate a copy.

G. A. Fadler
Director of Purchases
Westinghouse Electric Corp.
Pittsburgh

Please send 15 copies for our training staff.

Horace W. Schneider
Training Director
American Brass Co.
Waterbury, Conn.

Foreign Steel Output of Interest

We would appreciate two reprints of your excellent article, "Rising Foreign Steel Output" (STEEL, Jan. 27, p. 105).

W. E. Johnson
Assistant to Executive Vice President
Phoenix Mfg. Co.
Joliet, Ill.

Company Needs Selector

As one phase of operation, we erect and operate boilers for the U. S. Navy and Merchant Marine. The other day we had occasion to use STEEL's welding electrode selector chart (Apr. 1, 1957, insert) and find it applicable to this business. Would you forward five copies?

Edward F. Robinson
Foster Wheeler Corp.
Haddonfield, N. J.

No Mobile Home Industry Data

I would appreciate three reprints of STEEL's article, "Marketing Shifts into High Gear" (Jan. 6, Page 115) and a copy of your booklet, "Facts and Figures of the Metalworking Industry" (Page 159) in the same issue. Why don't you list mobile home industry statistics in the facts booklet?

G. O. Clay
Purchasing Agent
Southwest Div.
American Coach Co.
Newton, Kans.

• *We do not receive any regular, comprehensive statistical data on that industry. We would consider its use if such data were available.*

Your Sales Battles Won Easier with Phillips Screw Quality Control Plan

George Romney, industrial statesman, sums up the quality-control activity of the Screw Research Association this way:

"Control that assures a good quality product is one of the most important assets any industrial organization can have."

The Phillips Cross-Recessed Head Standards Committee has set up standards assuring reliability in delivering every advantage inherent in the Phillips Recess design. This means adherence to the best possible dimensional designs and the use of recommended inspection gauges and methods.

Phillips Screws made by the companies listed below improve your products, assure their fastener safety and reduce your production costs.

MR. GEORGE ROMNEY is president, American Motors Corporation and president, Automobile Manufacturers Association. He says, pertinent to the Screw Research Association's plan, "The more care you use in selecting top quality materials and parts, the easier it is for you to win your sales battle."

Members of Screw Research Association...

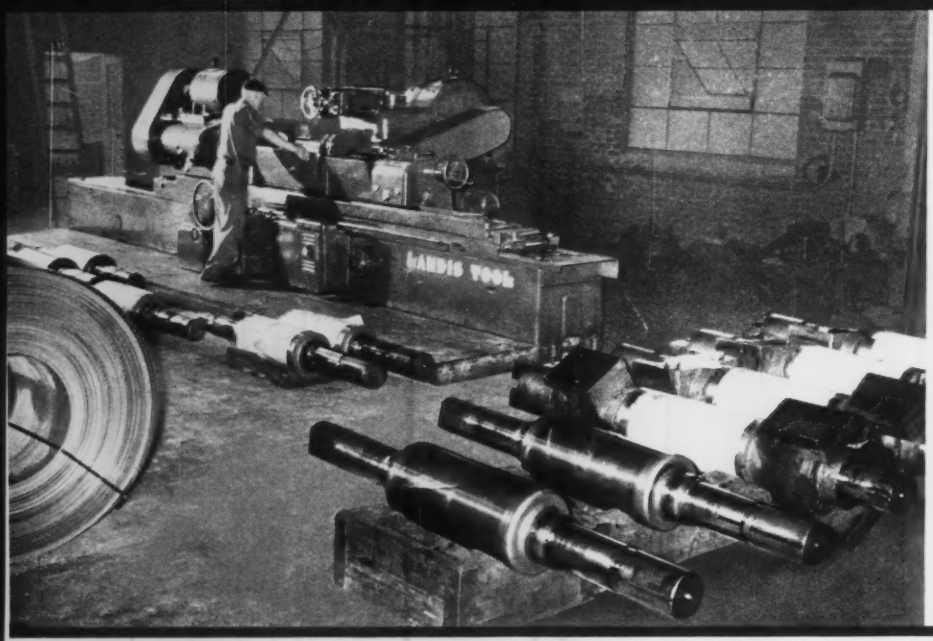
You can rely on these sources . . . for product reliability

American Screw Company • Atlantic Screw Works, Inc. • The Blake & Johnson Co. • Central Screw Company • Continental Screw Co. • Elco Tool and Screw Corporation • Great Lakes Screw Corp. • The H. M. Harper Company • The Lamson & Sessions Company • National Lock Company • The National Screw & Manufacturing Company • Parker-Kalon Division, General American Transportation Corporation • Pheoll Manufacturing Co. • The Progressive Manufacturing Company Division, The Torrington Company • Scovill Manufacturing Company • Shakeproof Division Illinois Tool Works • The Southington Hdwe. Mfg. Company Sterling Bolt Company • Universal Screw Company • Wales-Beech Corporation

Fast, accurate roll grinding from

You can get results like these from Landis precision features

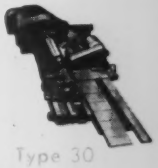
Mirror finishes like this are the result of combining rigid heavy machine parts, smooth vee belt drives, and Landis Microsphere Spindle Bearings.



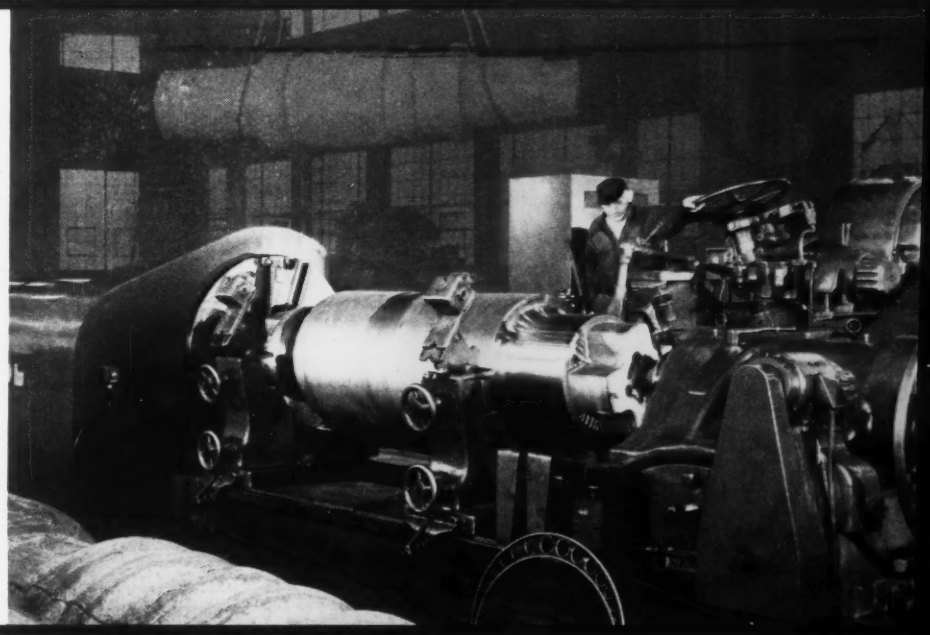
Easily duplicated, accurate roll contours, from the Landis crowning and concaving mechanism. Ease of adjustment reduces setup time and eliminates cut and try methods.

LANDIS TOOL COMPANY / WAYNESBORO, PENNSYLVANIA

the Landis line of *precision* machines

Condensed specifications	Sine Bar Roll Grinder	Type FR Roll Grinder	Type B Roll Grinder	 Type 30 Roll Grinder
Work swings	10″ & 14″	18″ & 24″	20″-24″-28″	36″-44″-50″-60″
Distances between centers	48″ to 72″	72″ to 240″	96″ to 192″	120″ to 288″
Standard grinding wheel size	14″ x 1½″	30″ x 3″	30″ x 3″	36″ x 4″
Work drive motor hp	1 hp	3 hp	7½ hp	36″-44″ 20 hp 50″-60″ 30 hp
Wheel drive motor hp	3/5 hp	25 hp	30 hp	40 hp

Ample power to start any roll within the capacity of the machine. Landis heavy beds and massive construction permit rough or finish grinding on all types of rolls.



LANDIS
precision grinders

TM Triple-Safe ALLOY CHAIN

sweet music
for safety-minded,
cost-conscious men
throughout industry!

GAMMA RAY QUALITY CONTROL!

X-Ray type testing of master, joiner and end links assures safe, trouble-free welds.

CONTROLLED ATMOSPHERE HEAT-TREATING

on all popular sizes provides uniformity throughout the sling assembly.

EXCLUSIVE, PATENTED TAYCO HOOKS!

I-Beam type design plus alloy steel construction mean extra safety!

Pat. No. 2,646,306

REGISTERED!
You get a certificate of test with every TM Alloy Chain. It bears the chain's guarantee . . . proof test . . . serial number.

CERTIFICATE OF TEST

Boost safety records up—and pull chain costs down with TM Alloy Chain. Gamma Ray Quality Control, Controlled Atmosphere Heat-Treating and Tayco Hooks make it *triple-safe* . . . stronger . . . more resistant to shock, work-hardness and grain-growth! See your Distributor, or write for Bulletin 15.

S. G. TAYLOR CHAIN CO., INC.
Plants: Box 509, Hammond, Indiana
3505 Smallman St., Pittsburgh 1, Pa.

Chain is our specialty, not our sideline!

TAYLOR MADE
A GREAT NAME IN
Chain SINCE 1873

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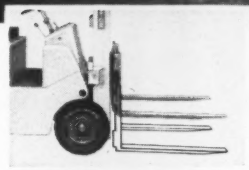
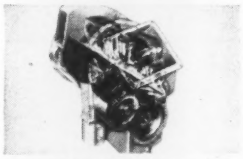
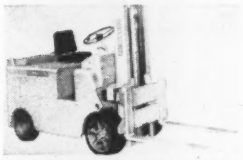


Towmotor's Maximum Free Lift Range tops all for reachability—lets you safely utilize the "top ½" of valuable storage space usually wasted.



TowmoTorque Drive offers you cushioned "creep" control unequalled in the industry today. Driving ease is more than tripled when you add Towmotor Power Steering.



New "Pace-Maker" Model 600 is typical of the easy-handling fork lift trucks in the combined Towmotor-Gerlinger line. Load capacities from 1500 to 40,000 pounds.

Today's industries need Towmotor Continuous Operation

New Towmotor "Pace-Maker" Fork Lift Truck is easiest to enter, maneuver and control

Towmotor engineering has skillfully combined dual-entry convenience, extra leg-room, handy 12-inch reach controls and easy maneuvering ability in the new "Pace-Maker" series fork lift trucks. You get a lot of advance features not duplicated in any other industrial truck!

Towmotor balanced weight distribution assures full traction with or without load. Positive-action hydraulic lift system guarantees instant response. Maximum free lift range is tops in industry. New standards of easy handling are established by "Pace-Maker" features like these!

Send for Booklet SP-23 showing how industry's most complete line of fork lift trucks will improve your plant operations and lower your production costs.

Leaders for 39 years in building Fork Lift Trucks, Tractors and Carriers

TOWMOTOR -GERLINGER
THE ONE-MAN-GANG

Gerlinger Carrier Co. is a subsidiary of Towmotor Corporation, Cleveland 10, Ohio

☐ Send free Towmotor Booklet SP-23

☐ Send free Certified Job Studies relating to our business which is:

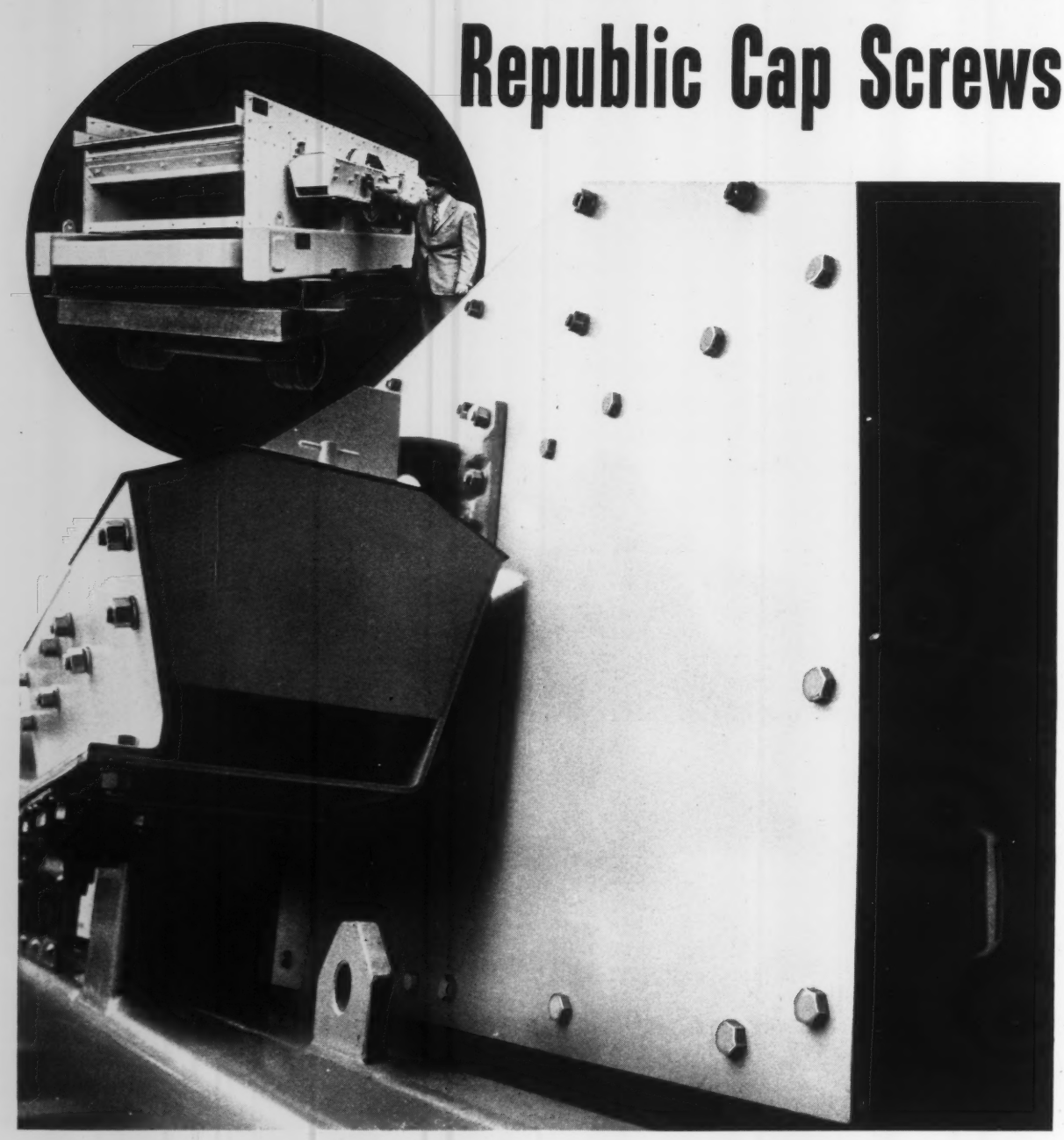
Name_____

Company_____

Address_____

Mail to **TOWMOTOR CORPORATION,** Cleveland 10, Ohio

Republic Cap Screws



FINAL ASSEMBLY OF MAJOR COMPONENTS on Ty-Rock Vibrating Screens uses fine-thread cap screws of several different steel analyses, depending on particular application. The W. S. Tyler Company finds this construction distributes loads better and eliminates danger of fatigue failure due to vibration and cyclic loading. Republic Cap Screws have proved more than equal to every requirement.

REPUBLIC

REPUBLIC STEEL

World's Widest Range of Standard Steels

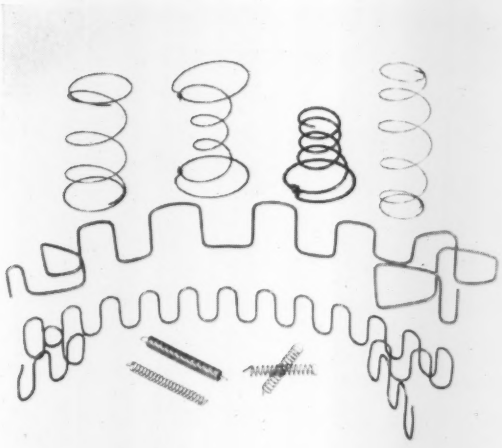
Protect Shaker Screen Performance

Sorting and sizing ton after ton of jolting, jarring, abrasive material is all in a day's work for Ty-Rock Vibrating Screens, built by The W. S. Tyler Company of Cleveland, Ohio. Satisfactory performance under these brutal conditions requires not only design and manufacturing skill, but a thorough knowledge of materials.

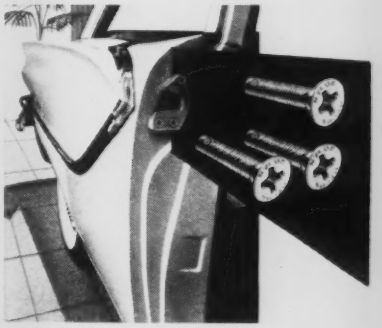
For example, Tyler has studied all types of fasteners and techniques to determine the best method of assembling heavy components. Experience has proved Republic Cap Screws more than a match for this rugged application. The clamping force produced by these strong, precision fasteners withstands both severe vibration and dynamic loading without stretching or danger of fatigue failure. The result is year-in, year-out dependability of Tyler equipment, plus easy replacement of particular parts subject to extreme abrasion.

Maximum performance under all operating conditions is typical of Republic's complete line of top-quality cap screws. Types include Hex Head, Flat Head, and Fillister Head in a wide range of sizes. All are available with either coarse or fine threads in high carbon, heat treated steel and low carbon, bright steel—plus many analyses of alloy steel and Enduro® Stainless Steel. All have finished points and full-size bodies.

For complete information on Republic Cap Screws, contact your local Republic office. Or mail coupon for data.



SPRING WIRE PERFORMANCE in your product is assured by Republic quality. Standard High Carbon Spring Wire and MB High Carbon Wire are produced by specialists who know and understand both steel making and high carbon wire drawing practices. They know spring forming machines and the importance of physicals, finish, cast and size accuracy in the end product. Republic Hard Drawn Round Steel Spring Wire, untempered, is providing outstanding performance in automotive seat and back cushions, furniture, bedding, and mechanical spring applications. Lower chemistry Border, Brace, Link and Crimping Wires are produced to the same high quality standards. Our metallurgists will assist you in selection, application and processing. Send coupon for details.



PERFORMANCE OF THIS SAFETY DOOR LATCH is protected by Republic Nylok® Bolts. They adjust to permit precise positioning of striker plate. Nylon pellet imbedded in bolt forces tight metal-to-metal lock between opposite threads, whether or not fastener is seated. Striker plate is permanently positioned to assure proper operation. Send coupon for facts.

STEEL

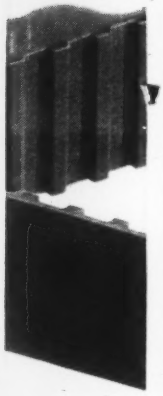
and Steel Products

REPUBLIC STEEL CORPORATION
DEPT. C-4396A
3120 EAST 45TH STREET • CLEVELAND 27, OHIO

Please send further information on:
- ☐ Cap Screws
- ☐ Nylok Bolts
- ☐ Spring Wire

Name_____ Title_____
Company_____
Address_____
City_____ Zone____ State_____

Here's what Morse's entry into the "Timing"® Belt field means to you . . .



Nobody gives you a more impartial analysis of your power transmission problems than Morse, because . . . *only Morse* offers all four of these basic drives plus a complete line of power transmission products

Basic Drives: Roller Chain, Silent Chain, Hy-Vo® Drives, and "Timing"® Belt.

Chain: High-Endurance (H-E), 8-series (Super Strength), Double-Pitch, Conveyor, Implement, and Attachment; AL, BL, Cable Chain, and Roller-less Lift Chain; Industrial Standard and 3/16″ Silent Chain.

Stock Sprockets: Plain Bore, Finished Bore, Taper-Lock—also made to order.

"Timing" Belt Sprockets: Plain Bore, Taper-Lock, Q.D.—also made to order.

Couplings: Flexible Roller Chain Couplings, Flexible Silent Chain Couplings, Morflex Couplings, Morflex Radial Couplings, and Marine Couplings.

Driveshafts: Morflex and Radial Driveshafts.

Clutches: Cam (Over-Running, Back-Stopping, Indexing); Pullmore; Over-Center, Centrifugal.

Speed Reducers: Eberhardt-Denver "RW" poweR-gear® Reducers; Gear Motors; "L" Worm Gear Reducers; "VX" and "DVX" Conveyor Drives; Miter Boxes; Helical Reducers.

Torque Limiters.

Look for your local Morse distributor in the Yellow Pages under "Power Transmission," or write:

MORSE CHAIN COMPANY, DEPT. 2-28, ITHACA, N.Y. Export Sales: Borg-Warner International, Chicago 3, Ill.

1. **"Timing" Belt** . . . for light weight and lubrication-free operation. Morse "Timing" Belts give positive, high-efficiency transmission from 0 to 16,000 FPM, 1/100 HP to 1,000 HP . . . provide slip- and stretch-proof service for life of drive.

2. **Roller Chain** . . . for low and medium speed applications. Precision-finished Morse Roller Chain is specially treated to withstand shock and fatigue, assure less maintenance, longer service life. Patented Spirol Pin Fastener construction.

3. **Silent Chain** . . . for smoother, quieter operation at higher speeds. In Morse Silent Chain the patented rocker joint operates with less friction and wear. It provides a cooler-running chain drive, with higher efficiency and longer service life.

4. **Hy-Vo Drive** . . . for extremely high speeds and horsepower. Exclusive with Morse, extra-tough Hy-Vo Drives transmit mile-a-minute speeds, and up to 5,000 hp loads; require minimum shaft space, usually eliminate outboard bearings.

IN POWER TRANSMISSION
THE TOUGH JOBS COME TO

MORSE

MORSE B-W BORG-WARNER

Plants in: Ithaca, N.Y., Detroit, Mich., Chicago, Ill., Denver, Colo., Simcoe, Ont.

*Trademark

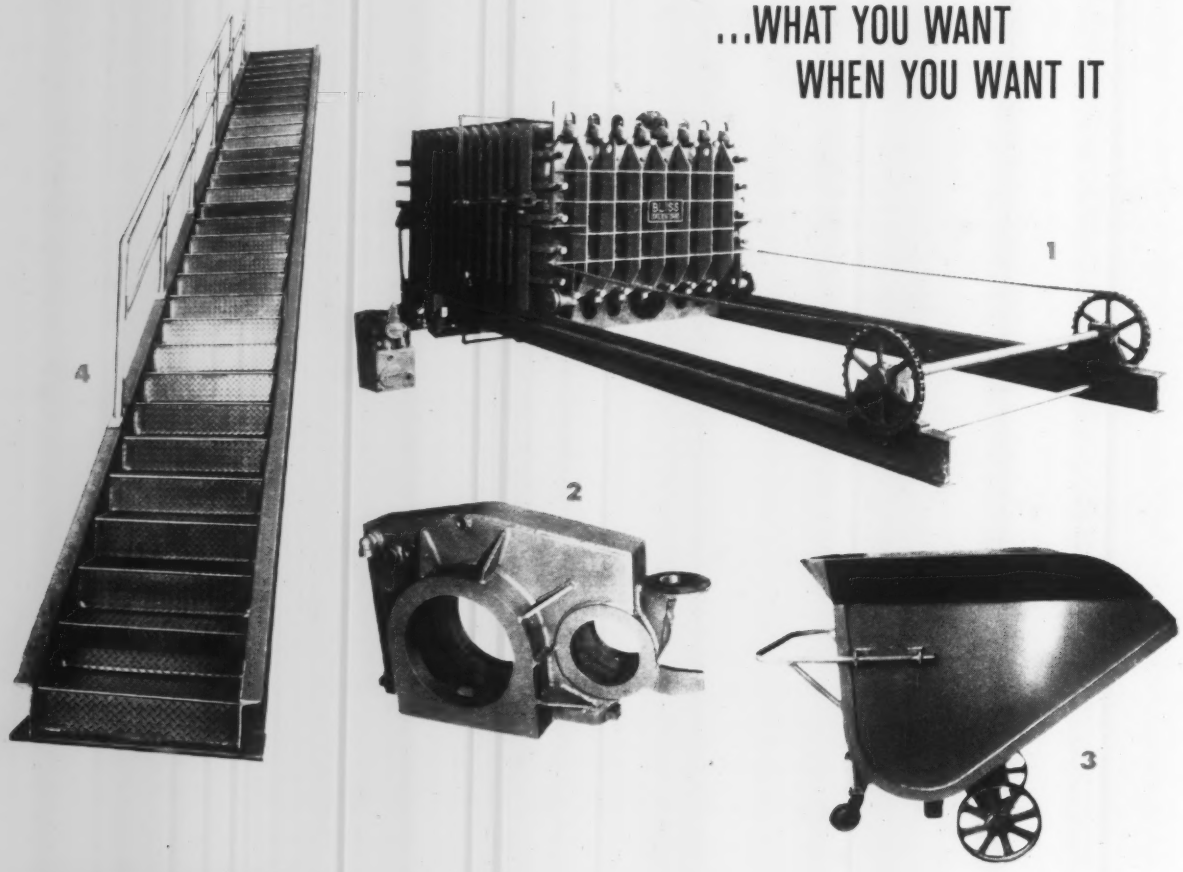
Here are just four examples of the wide range of contract weldments now being fabricated by Bliss. Large and small, ferrous and non ferrous, calling for specialized techniques, jobs like these are an every-day thing to the Bliss personnel in Contract Manufacturing.

Their experience, combined with heavy machining, welding, metallurgical treatment and inspection facilities, make Bliss a reliable source of welded fabrications. If weldments are your problem, drop us a line...we'll be glad to discuss it with you.

WELDMENTS BY BLISS

...WHAT YOU WANT WHEN YOU WANT IT

1 FILTER PRESS, used in processing of aluminum ore, requires extensive amount of welding. **2 GEAR CASE FOR SUBWAY CAR DRIVE UNITS** is made of welded, pre-machined steel plate; it weighs less than original casting and lowered machining costs. **3 LIGHTWEIGHT ALUMINUM CHIP BUGGY,** welded by Bliss to customer design, reduces handling fatigue considerably. **4 WELDED ALUMINUM STAIRWAY** for factory is rugged, light, attractive, requires no maintenance.



BLISS SINCE 1857 ®

100 years of making metal work for mankind

E. W. BLISS COMPANY

With major weldment facilities at two plants: Salem and Canton, Ohio

CALENDAR
OF MEETINGS

Feb. 18-20, Caster & Floor Truck Manufacturers Association: Annual meeting, New Weston Hotel, New York. Association's address: 27 E. Monroe St., Chicago 3, Ill. Executive secretary: H. P. Dolan.

Feb. 19-21, American Management Association: Special research and development conference, Biltmore Hotel, New York. Association's address: 1515 Broadway, New York 36, N. Y. President: Lawrence A. Appley.

Feb. 24-26, Association of Iron & Steel Engineers: Western meeting, Hotel Statler, Los Angeles. Association's address: 1010 Empire Bldg., Pittsburgh 22, Pa. Managing director: T. J. Ess.

Feb. 26-28, American Management Association: Special general management conference, Roosevelt Hotel, New York. Association's address: 1515 Broadway, New York 36, N. Y. President: Lawrence A. Appley.

Feb. 28-Mar. 1, American Society for Quality Control: Middle Atlantic conference, Hotel Statler, New York. Conference chairman: F. W. Kroll Jr., Esso Standard Oil Co., Box 222, Linden, N. J.

Mar. 2-6, American Society of Mechanical Engineers: Gas turbine power division conference and exhibit, Shoreham Hotel, Washington. Society's address: 29 W. 39th St., New York 18, N. Y. Secretary: C. E. Davies.

Mar. 3-5, American Management Association: Special finance conference, Statler Hotel, New York. Association's address: 1515 Broadway, New York 36, N. Y. President: Lawrence A. Appley.

Mar. 4-6, Society of Automotive Engineers: National passenger car, body, and materials, meeting, Sheraton-Cadillac Hotel, Detroit. Society's address: 485 Lexington Ave., New York 17, N. Y. Secretary: John A. C. Warner.

Mar. 9-11, American Machine Tool Distributors Association: Spring meeting, Roosevelt Hotel, New Orleans. Association's address: 1900 Arch St., Philadelphia 3, Pa. General manager: James C. Kelley.

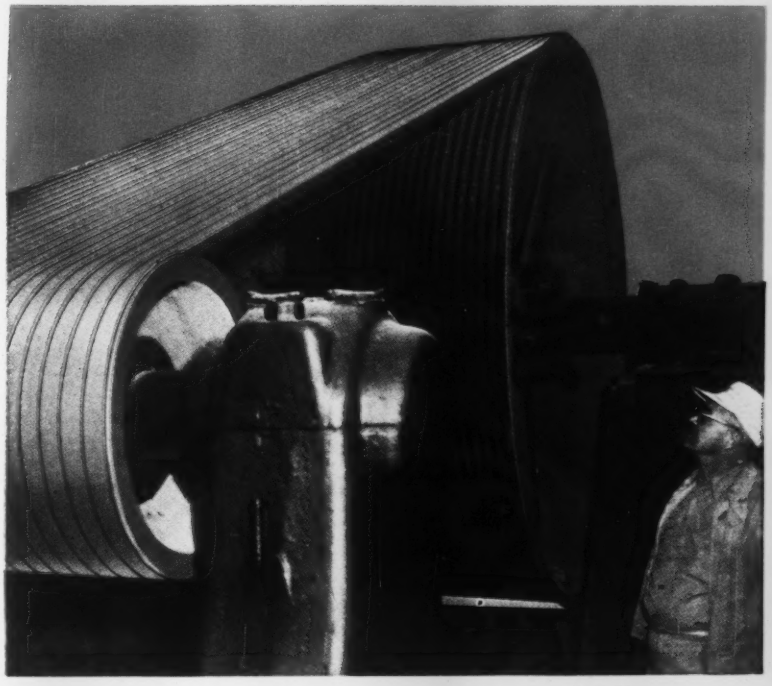
Mar. 10-14, National Association of Manufacturers: Institute on industrial relations, Hollywood Beach Hotel, Hollywood, Fla. Association's address: 2 E. 48th St., New York 17, N. Y. Information: Mrs. Sybyl S. Patterson, associate director, Industrial Relations Div., NAM.

Mar. 11-13, Instrument Society of America, Pittsburgh Section: Annual conference on instrumentation of the iron and steel industry, Roosevelt Hotel, Pittsburgh. Secretary: Frank K. Briggs, Atomic Power Div., Westinghouse Electric Corp., Large, Pa.

Mar. 12-14, Pressed Metal Institute: Annual spring technical meeting, Sheraton-Cadillac Hotel, Detroit. Institute's address: 3673 Lee Rd., Cleveland 20, Ohio. Managing director: Harold Daschner.

Mar. 15-18, National Association of Waste Material Dealers: Annual meeting, Waldorf-Astoria Hotel, New York. Association's address: 2 E. 48th St., New York 17, N. Y. Managing director: Clinton M. White.

Mar. 17-21, Nuclear Congress and Atomic Industry Trade Show: International Amphitheatre, Chicago. Information: International Atomic Exposition Inc., 12 S. 12th St., Philadelphia 7, Pa.



Why *concave sides* insure longer V-Belt life

With one simple test you can demonstrate to yourself why the concave sides (Fig. 1) of the Gates V-Belt insure far longer belt life.

Just feel the sides of a Gates V-Belt on the bend. Note that in bending around the sheave these sides fill out and become straight (Fig. 1-A). That means the belt makes full contact with the sides of the sheave groove; grips the sheave *evenly*.

This even contact distributes wear uniformly across the sides of the belt. Uniform wear lengthens belt life; keeps costs down.

Fig. 2

Now make the same test with a straight-sided belt (Fig. 2) and see what happens. The sides bulge out on the bend (Fig. 2-A) concentrating wear at the points shown by arrows. Uneven wear shortens belt life; increases belt costs.

Cut V-belt replacement costs and down time. Specify belts that grip evenly and wear longer . . . specify Gates Vulco Rope — the V-Belt with concave sides.

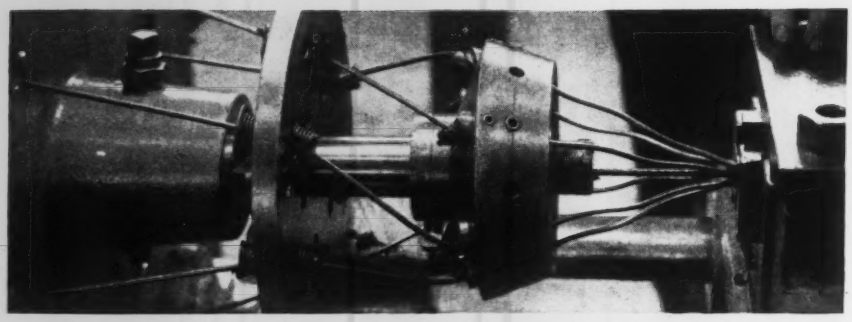
The Gates Rubber Company • Denver, Colorado

World's Largest Maker of V-Belts

There are Gates Engineering Offices and Distributor Stocks in all industrial centers of the United States and Canada, and in 70 other countries throughout the world.

TPA 150

Gates VULCO ROPE Drives



Close-up view of preforming Lang Lay rope by the quill head method in Upson-Walton's Cleveland plant. Stranded wires are threaded through a guide-plate to the quills for preforming of strands prior to entering the closing dies.

YOUNGSTOWN "YOLECTRO" ROPE WIRE

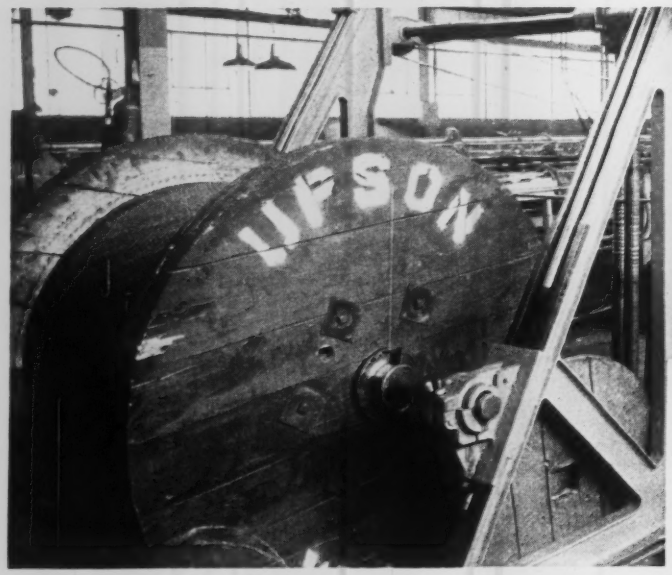
. . . builds strength and safety into **UPSON-WALTON** *wire rope*

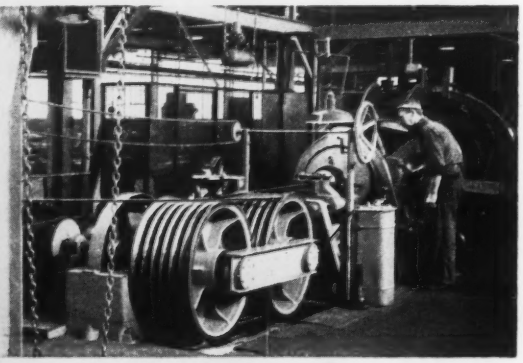
Strength and safety are qualities characteristic of Upson-Walton's complete line of wire rope and rope fittings. For nearly 86 years this progressive Cleveland manufacturer has kept their product quality at the highest possible level.

Playing an important part in the Upson-Walton story is Youngstown "Yolectro" High Carbon Rope Wire. It's the basic material used to fabricate their various grades of wire rope. "Yolectro" Rope Wire's high degree of strength, toughness, abrasion resistance, gage uniformity and proper flexibility all contribute to the quality associated with Upson-Walton products.

"Yolectro" Rope Wire is closely quality-controlled throughout all its production operations from iron ore mining to final drawing and coating. This guarantees the desired balance of properties to meet your most exacting requirements. Why not make "Yolectro" your permanent specification for quality production? It's available with either a Bright or Galvanized finish in all AISI high carbon grades.

Metallurgical assistance or additional information is available from your nearest Youngstown District Sales Office. Why not write or phone them today?





Upson-Walton's 32" closer is capable of closing wire rope up to 1⅜" in diameter of six-strand construction. Bobbins of stranded wire are loaded into the cradles of the machine and guided to the preforming head and closing dies where it is closed into finished wire rope. Finished wire rope consists of stranded wire from 7 to 41 wires per strand closed around a fibre or steel core, depending upon customer requirements and applications.

QUALITY YOUNGSTOWN SERVICE

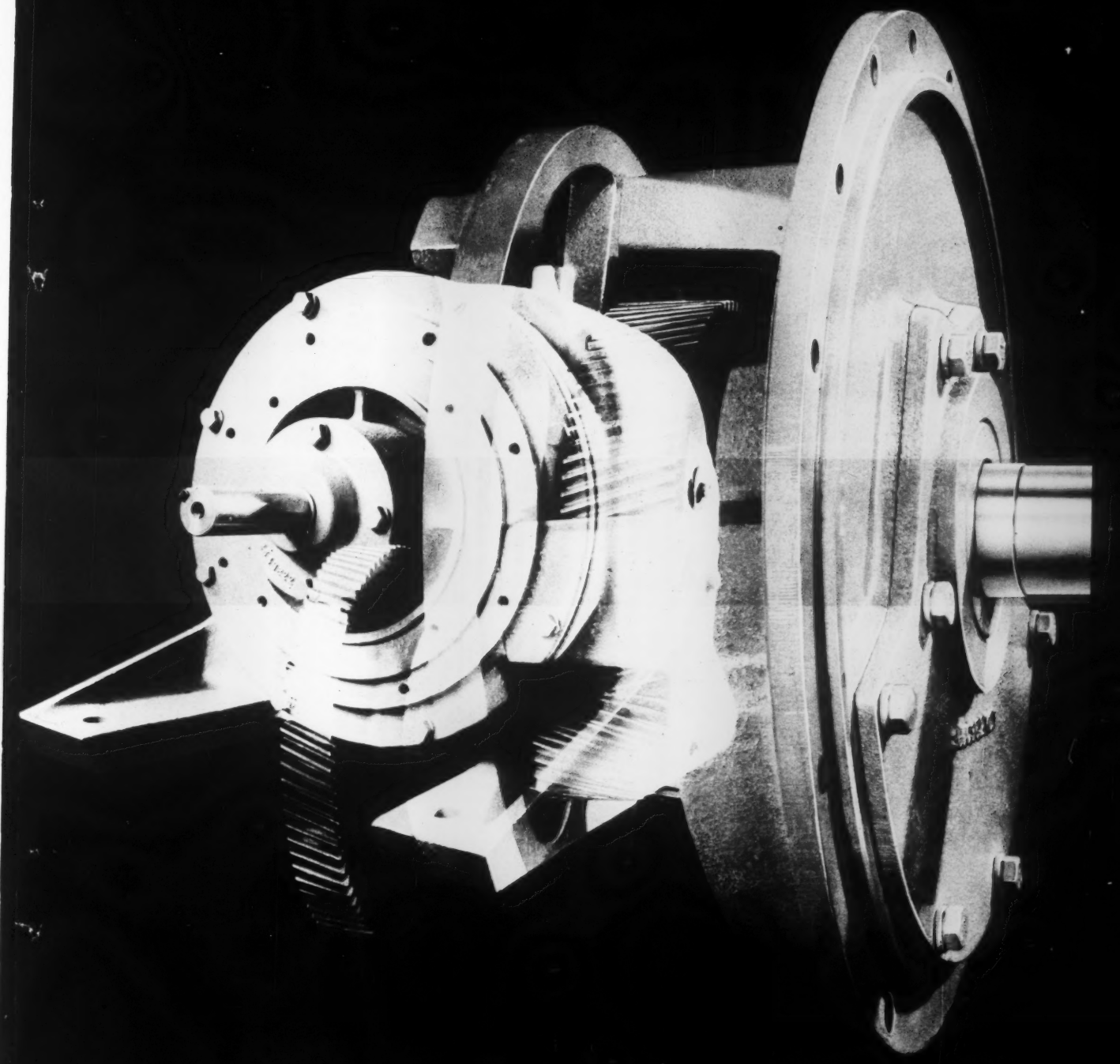
THE YOUNGSTOWN SHEET AND TUBE COMPANY

Manufacturers of Carbon, Alloy and Yoloy Steel

General Offices - Youngstown 1, Ohio

District Sales Offices in Principal Cities

EXCLUSIVE DEVELOPMENT OF WESTINGHOUSE ELECTRIC CORPORATION

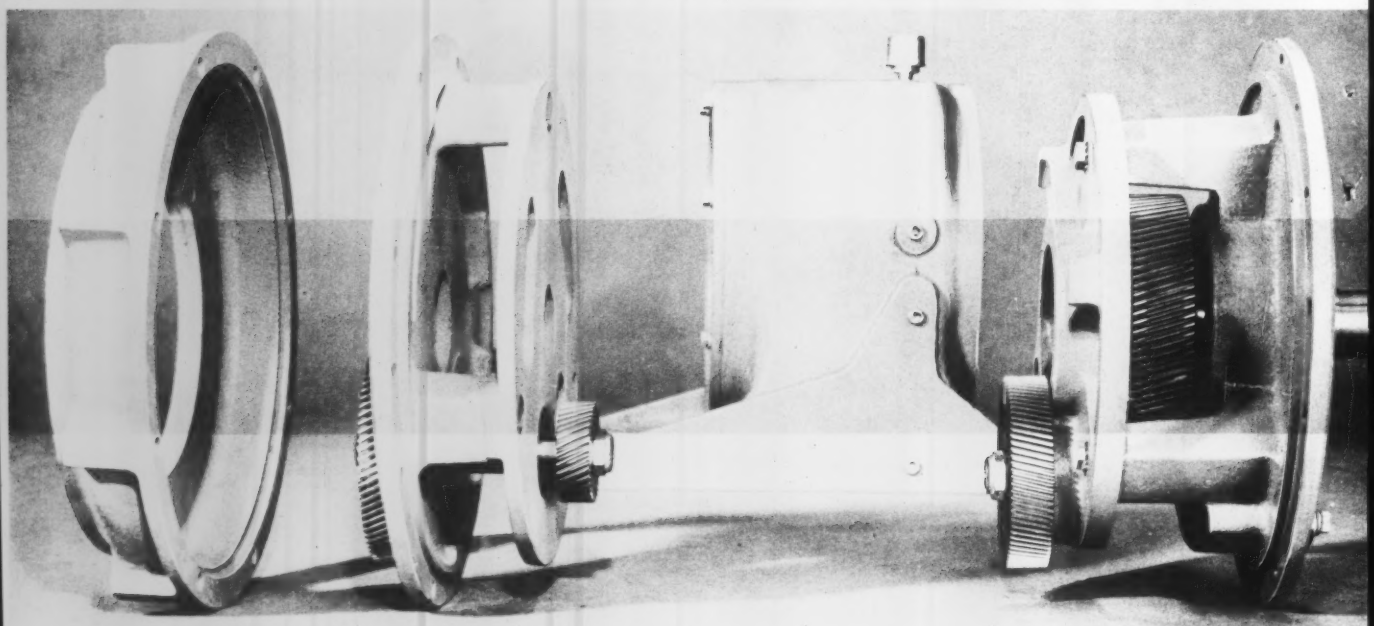


NEW MODULINE GEAR UNITS

OFFER YOU ORIGINAL ADVANTAGES IN
SIMPLICITY • VERSATILITY • DEPENDABILITY

MODULINE

IS ORIGINAL IN SIMPLICITY...IN VERSATILITY



Basic Moduline components combine to form double, triple or quadruple reduction speed reducers, gearmotors or package motor reducer drives with gear ratios from 4.17:1 to 985.3:1.

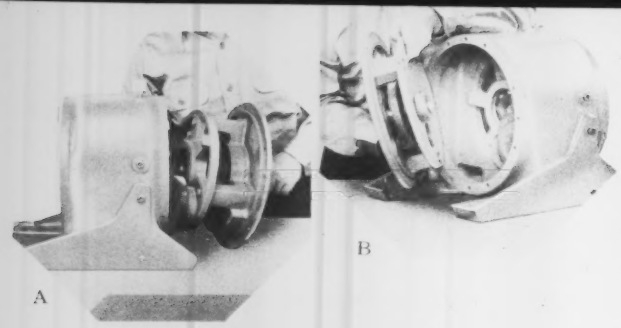
These preassembled modules standardize over 20,000 variations of gearmotors, speed reducers and package motor reducer drives

Look over the simplicity, dependability and versatility you get from Westinghouse Moduline gear units. Here you'll find original answers to solve long-standing problems in application of gearmotors and package motor reducer drives from 1 to 30 hp; foot-mounted speed reducers from 1 to 75 hp; and shaft-mounted speed reducers from 1 to 40 hp, including concentric shaft and right angle configurations.

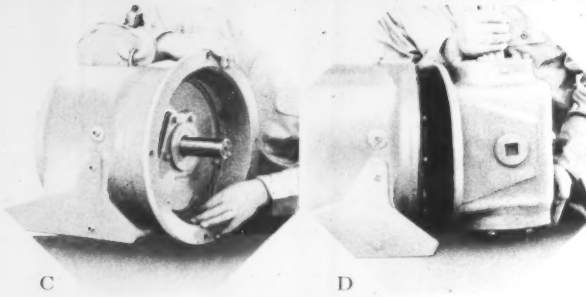
What's more, just seven Moduline frame sizes cover these broad ranges. By ordering Moduline drives, together with any type of Westinghouse Life-Line® motors, you combine two purchases in one order with complete assurance of design and application coordination.

JI-07368-2

EXCLUSIVE DEVELOPMENT OF



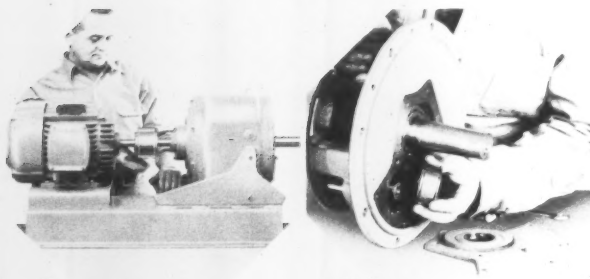
A B



C D

For *speed reducer* assemblies (above), reducer case and low-speed cage assembly with 5:1 gear ratio combine with high-speed change pinion and gear set (A) which are available in nine standard ratios from 1:1 to 5:1 and for double reductions up to 25:1. For triple and quadruple reductions, add change gear set and high-speed cage assembly (B) . . . with either a 5:1 or a 25:1 ratio . . . for total ratios up to 625:1. For *vertical mounting*, add flange and face-type seal (C). For *right angle* output units, add head assembly (D).

E F



G H

Gearmotors and package motor reducer drives are assembled with AGMA standard flange-mounted motor (E) or NEMA standard foot-mounted motor, with either "sugar scoop" motor support (F) or combination bedplate (G). Backstop kit (H) can be added to any unit.

A standard wrench assembles or modifies any Moduline unit

Only a wrench is needed to work on Moduline units. Awkward gear pullers and troublesome fitting have been eliminated. It's another example of the original advantages you gain from Moduline design and quality.

Unusual manufacturing processes, preassembly and pilot fits make modular construction possible. All parts are accurately machined within very close tolerances. No checking, aligning or positioning of modules is necessary during assembly.

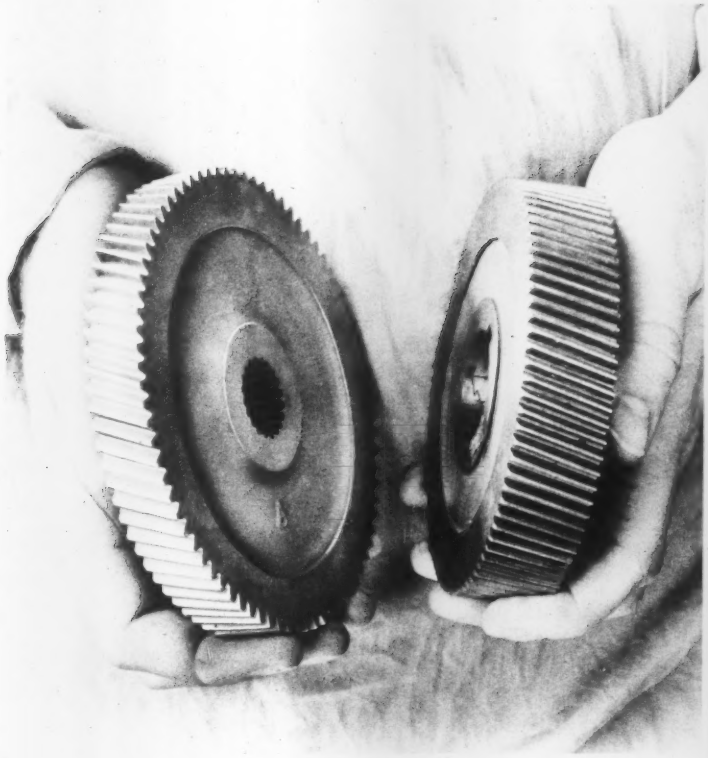
Moduline shafts are roll-formed to provide splined and threaded extensions for simple gear mountings. Pinions and gears have splined bores for ease of assembly. An elastic stop nut locks them in position.

JI-07368-4

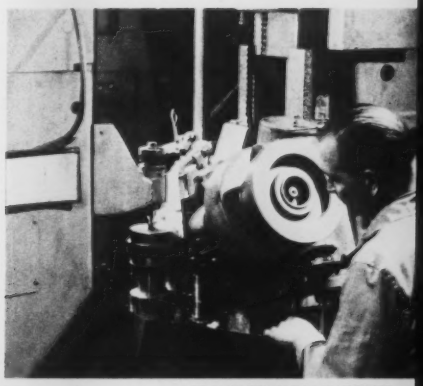
WESTINGHOUSE

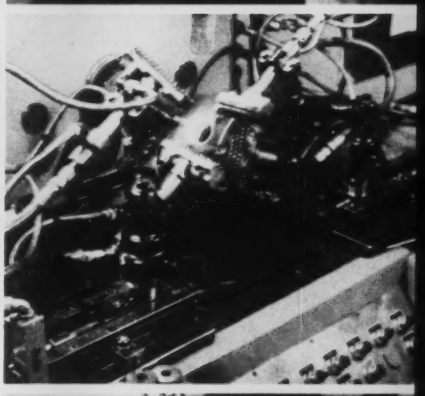
MODULINE

IS ORIGINAL IN DEPENDABILITY



Compare the Moduline ground tooth gear (left) with conventional gear. Note smooth finish, splined bore and drop-forge blank that's standard with all Moduline gears.





(*top*) Precision hobbing cuts Moduline gear teeth on alloy steel blanks

(*middle*) Through-hardening on automatic spin-flame equipment for extra wear resistance

(*lower*) Finish grinding to master gear standards

Only MODULINE combines ground "master gear" precision with tough, wear and shock-resistant alloy steels

See the difference between a conventional gear and a Moduline precision-ground, heat-treated gear. Moduline gear teeth are so accurate they meet AGMA master gear requirements for pin dimensions, pitch error, profile error and lead error. This means unusual dependability with quiet, efficient operation. Previously, you would have to special-order and pay a premium for the quality now made standard by Moduline. These precision gears have low sound levels and increased mechanical capacity. Spin-flame heat treatment and tempering produce hard, wear-resistant surfaces backed up by tough-hardened cores to stand up under all kinds of service.

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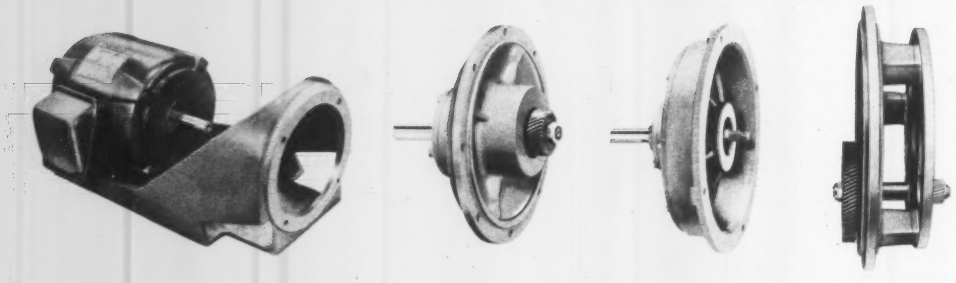
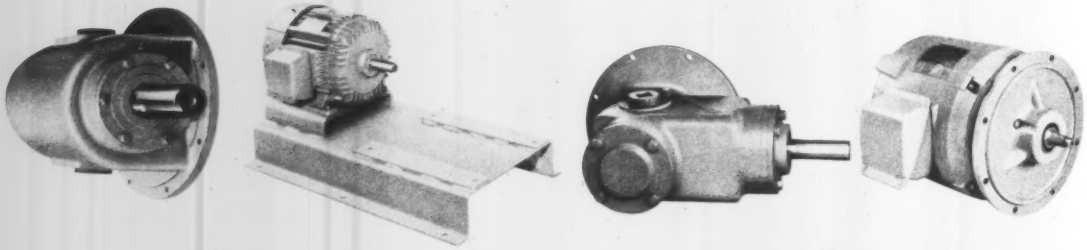
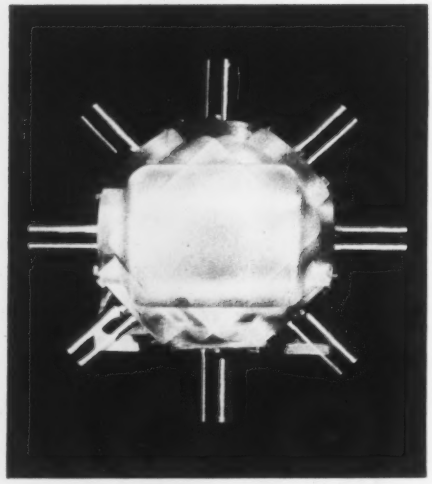


Moduline originality offers application and maintenance savings

Here are subassemblies for the most versatile gear drives on the market. From these modules . . . concentric shaft or right angle . . . integral gearmotors, package motor reducer drives and speed reducers can be assembled exactly to your specifications. Motor support brackets, right angle heads (in fact, all Moduline parts) go together in thousands of different ways to make the right drive for any job.





Moduline units can be installed in any location. Concentric shaft units can be mounted in any position on the floor, wall or ceiling . . . or at any angle in between. The output shafts of right angle units can be indexed in 8 or 12 positions for power take-off in almost any direction. Units are designed for electric motor or engine drive; chains, belts or gears may be used to put power into or take it out of them. Only Westinghouse offers Moduline units with right angle input or output assemblies. These 1 to 75 hp reducers with ratios from 7.6:1 to 985.3:1 can handle any job.

JI-07368-3

WESTINGHOUSE ELECTRIC CORPORATION

MODULINE

delivery is fast because it's "built in"

Original modular design and complete standardization of components simplifies specification, inventory control and gives fast deliveries from local Westinghouse warehouses.

Your local Westinghouse sales office fills your order from a nearby warehouse. Moduline drives are shipped completely assembled to your instructions, ready to go to work. All Moduline warehouses also carry complete stocks of renewal parts and subassemblies for the maintenance or modification of customer units. Fast parts deliveries and serviceability of Moduline designs reduce down time and maintenance costs to a minimum. A small inventory backs up many units for customers who prefer to stock their own parts and subassemblies.

...see MODULINE facts in action

A desk-top demonstration of Moduline scale models is the first step to lower gear drive costs. Your Westinghouse sales representative will arrange a demonstration; or write Westinghouse Electric Corporation, Gearing Division, 200 McCandless Ave., Pittsburgh 1, Pa.

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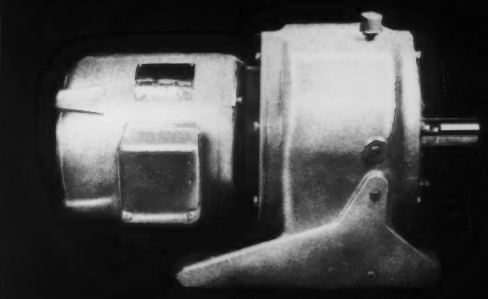
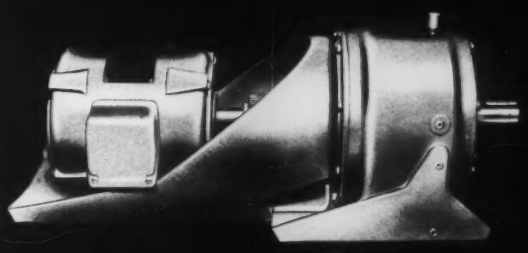
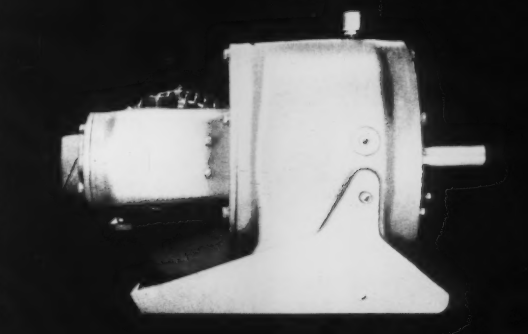
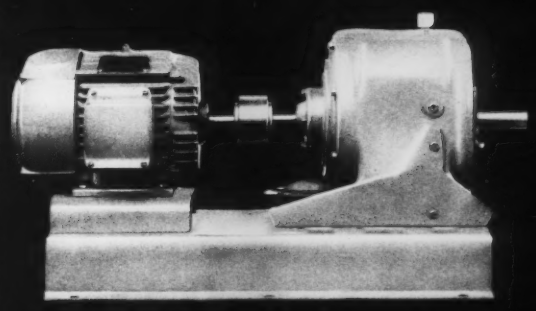








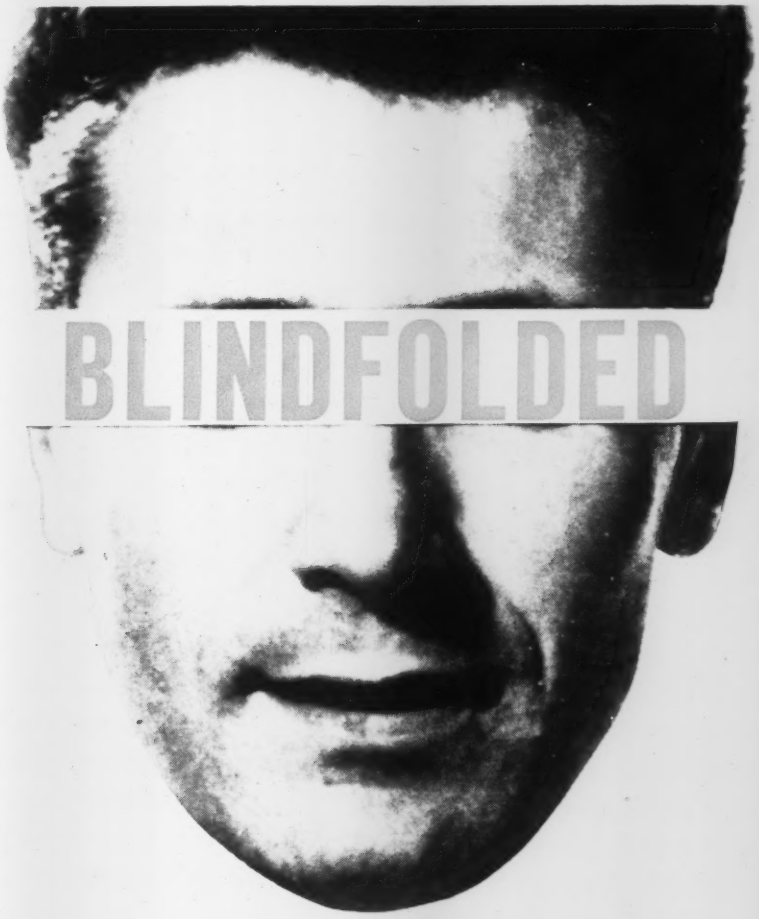
POWER-UP with MODULINE

a complete line of . . .
speed reducers . . . gearmotors . . .
and motor reducer drives

YOU CAN BE SURE...IF IT'S

Westinghouse

You Wouldn't Buy Hydraulic Fluids



only Houghton supplies all types—can give you unbiased recommendations.

Operating pressures and temperatures, pump and equipment design and degree of fire hazard all affect the selection of the right fluid.

Phosphate-Ester Fluids—Houghto-Safe 1000 Series

These fluids are available in three viscosities to meet the needs of systems running as high as 150°F., and where maximum lubricity is needed for heavy bearing loads. Used in deck-edge elevators in Navy carriers.

Water-Glycol Fluids—Houghto-Safe 600 Series

These fluids will adequately meet the requirements of up to 85% of all hydraulic systems. Houghto-Safe 600 series provides maximum fire protection with good lubricity for systems running up to 150°F. Used in catapults in Navy carriers.

Water-Oil Emulsion Fluids—Hydrolubric F.R.

These are lower cost fire-resistant fluids. They are stable, afford good lubricity and provide adequate fire protection where hazards are intermittent or remote.

When you think of fire-resistant hydraulic fluids —call on Houghton. You will get factual, unbiased recommendations of the fluid best suited to your equipment and degree of fire hazard. Factual folders describing these safe fluids are yours for the asking. Write E. F. Houghton & Co., 303 W. Lehigh Ave., Philadelphia 33, Pa.

HYDRAULIC FLUIDS . . . **products of**

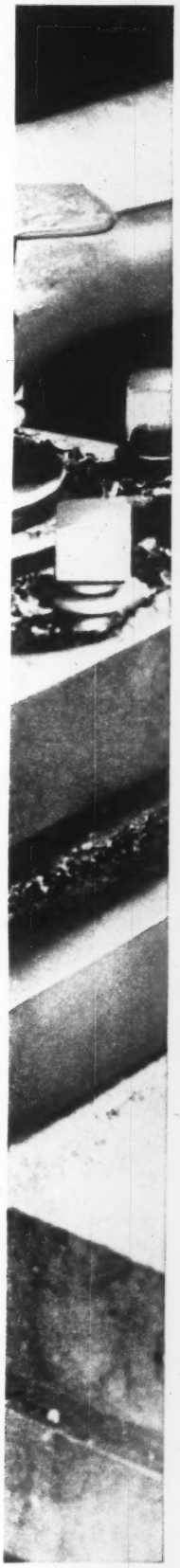
E. F. HOUGHTON & CO.

PHILADELPHIA • CHICAGO • DETROIT • SAN FRANCISCO

Ready to give you on-the-job service . . .

Roughing and finishing this large motor shaft, a modified Standard Carboloy Tool (tipped with Grade 350) boosted the number of linear inches cut by 30% over other tools.

SETUP: Material—AISI 1045 modified (hot-rolled). **Speed**—300 SFPM. **Feed**—0.020 inch. **Depth of cut**—1/16 to 1/8 inch. **Coolant**—Yes.



3 reasons why industry specifies more Carboloy® braze-type tools than any other brand

1 Consistent, record-breaking performance

Tough jobs, like the one at left, are the real test of a tool's performance. And in plant after plant, Standard Carboloy Tools have proved that they deliver maximum production – at lowest cost per piece. They're made by the company that pioneered "standards." Their shanks are of the finest cold-drawn steel. Their carbide edges are automatically diamond-ground for accurate machining.

2 Complete range of styles, sizes, grades

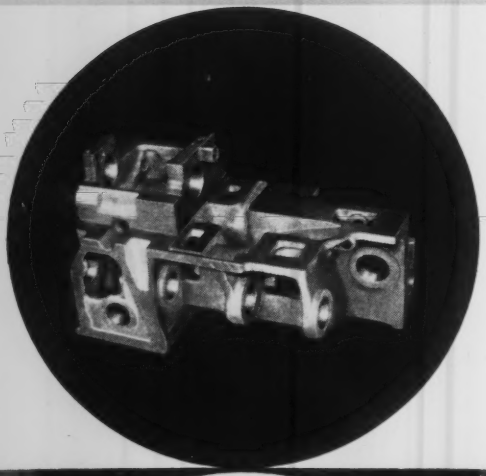
Standard Carboloy Tools are available in thirteen styles, hundreds of sizes. Used "as is" or adapted to specials, they can handle up to 80% of all single-point jobs – from rough turning to precision threading. They're available with tips of Carboloy Extra-Performance steel-cutting grades 330, 350, and 370. Or, with carbides for cast irons, super alloys, nonferrous and nonmetallic materials.

3 Immediate delivery from local stocks

There's no waiting for "long distance" delivery when you order Standard Carboloy Tools. Authorized Distributors of Carboloy cemented carbides in 140 cities keep full stocks on hand for off-the-shelf delivery. Your local Carboloy Distributor is listed in your Yellow Pages. Call him today. Or write: *Metallurgical Products Department of General Electric Company, 11141 E. 8 Mile Ave., Detroit 32, Michigan.*

CARBOLOY®
CEMENTED CARBIDES

GENERAL ELECTRIC



At Brown & Sharpe

Natcos Help From

At Brown & Sharpe, a 22-spindle Natco 3-way Machine handles finished drilling, boring and reaming on "00" screw machine beds

NATCO

Slash In-Process Time
16 Weeks to One Week

On Automatic Screw Machine Beds

Even on precise machine tool parts, traditionally handled on a "job-shop" basis, Brown & Sharpe gained great advantage by installing an automatic line. Prominent in the line are two Natcos, engineered and tooled to handle all drilling, boring and reaming on either the No. 00 or No. 2 automatic screw machine beds.

One Natco does all roughing—the second handles finishing. Total of 62 operations. Each Natco is tooled to process two parts at once—tooling is interchangeable to accommodate either sized bed.

Extreme machine tool accuracy must be maintained throughout. In one operation the Natco drills through five walls, holding centers parallel to the locating surface within .0015″ for the full 42″ distance. In another case, Natco engineering devised a tooling leaf that automatically drops through a core in the part, providing internal boring bar support.

Natcos make sense even on "job-shop" jobs. Call in a Natco Field Engineer—he can quickly tell you whether a Natco can be a cost-saver on your next job.

National Automatic Tool Company, Inc.

Richmond, Indiana *Multi-spindle drilling, boring, and tapping machines. Special machines for automatic production.*

Call Natco Offices in Chicago, Detroit, New York, Buffalo, Boston, Philadelphia, Cleveland, Los Angeles; distributors in other cities.

Great Names in Steel Making — IIII

OSCAR L. MAAG, *recipient of the ASLE National Award in 1956, was preeminently a lubrication engineer. Yet every mill in America that operates on roller bearings testifies to Oscar Maag's contribution to modern steel making.*

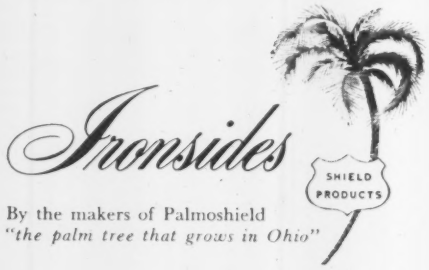
As sometimes happens in the initial trial of a new process or material, the first test of roller bearings in a rolling mill was quite successful. But as soon as increased speed and pressure were attempted, in a second installation, serious trouble developed.

The big Timken bearings (they measured 30″x16″ in diameter) were taken back to the company's plant at Canton, Ohio, where they were lapped and studied on the test stand. The cause of failure was in the calcium soap grease used to lubricate the bearings. Furthermore, it was evident that no type of lubricant then available was capable of handling the load.

At that critical moment Oscar Maag, Timken's lubrication specialist, had an inspiration. Experimentally, he added sulphur chlorinated base cutting oil to the grease.

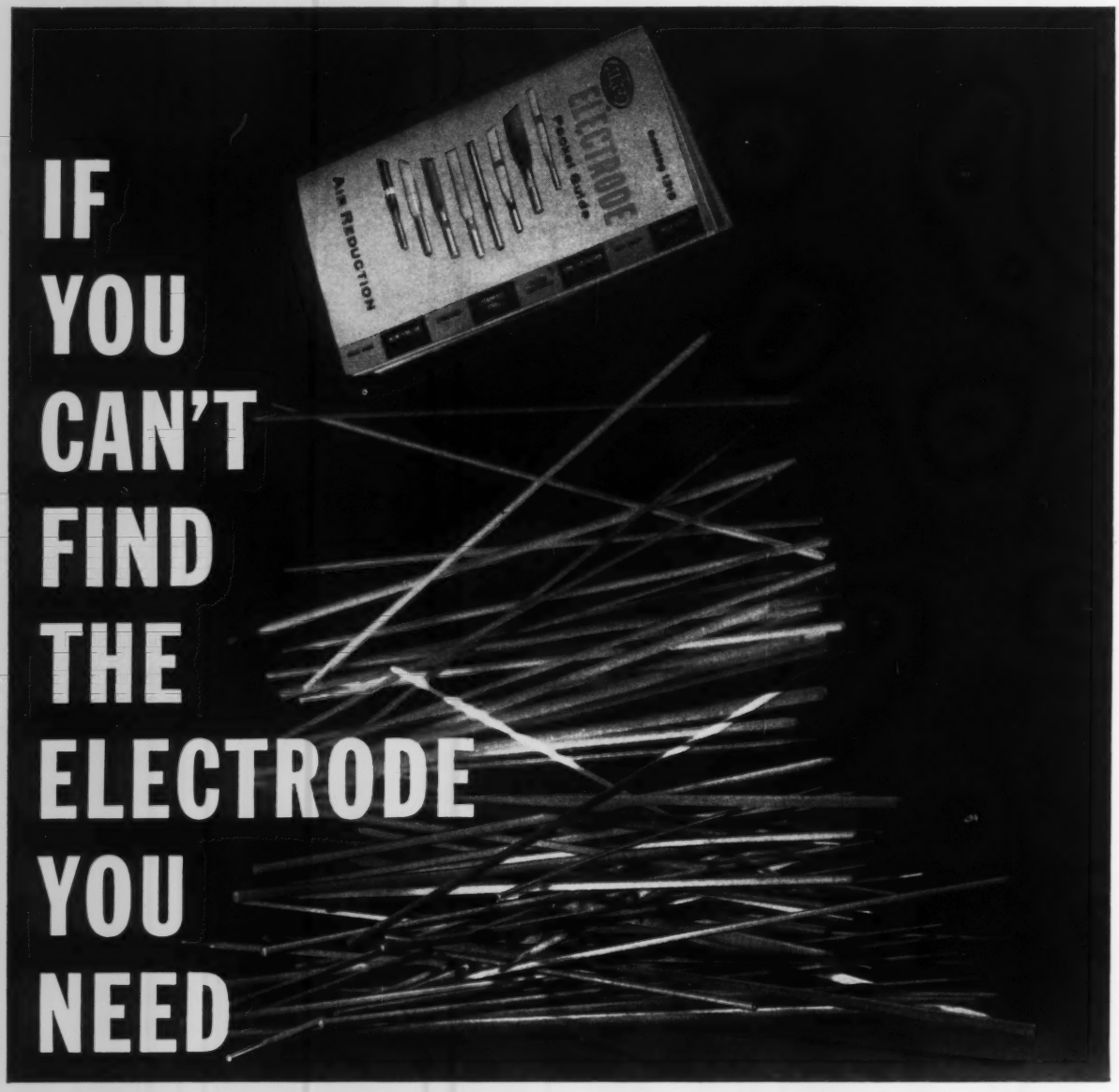
It was the first E. P. (extreme pressure) lubricant applied to rolling mill bearings, and it worked perfectly. Not only did it solve the immediate problem—it cleared the way for development of roller bearing mills in which speeds exceeding a mile-a-minute and pressures to 25,000 psi are successfully handled by today's Ironsides "E.P." lubricants.

As specialist for 65 years in the manufacture of lubricants for steel making, The Ironsides Company is especially pleased to honor Oscar Maag of The Timken Roller Bearing Company for his great contributions to our industry. It was our privilege, here at Ironsides, to work closely with Oscar Maag as our Company's consultant following his retirement from Timken, and to know him as both a great technologist and good friend. The Ironsides Company, Columbus 16, Ohio.



By the makers of Palmoshield
"the palm tree that grows in Ohio"

J. S. MARCHUT



. . . among Airco's complete line of over 100 different types, comprising of more than 450 sizes, lengths and grades, then the chances are it doesn't exist and we'd like to hear about it.

Most likely, if there is a need for a new and different electrode, Airco is already at work on it; for every year new, improved versions are added to the line. New Easyarc 30, for example, is a high-speed electrode that deposits 6 lbs more metal per hour than any other electrode.

Wherever you are located, you'll find Airco's complete line of electrodes easily and conveniently available through a nationwide network of Authorized Dealers. Look in the yellow pages of the phone book under "Welding Equipment" for the Airco office or Airco Authorized Dealer nearest you. If you do not already have the Airco Electrode Pocket Guide, shown above, we'll be happy to send you a copy on request.

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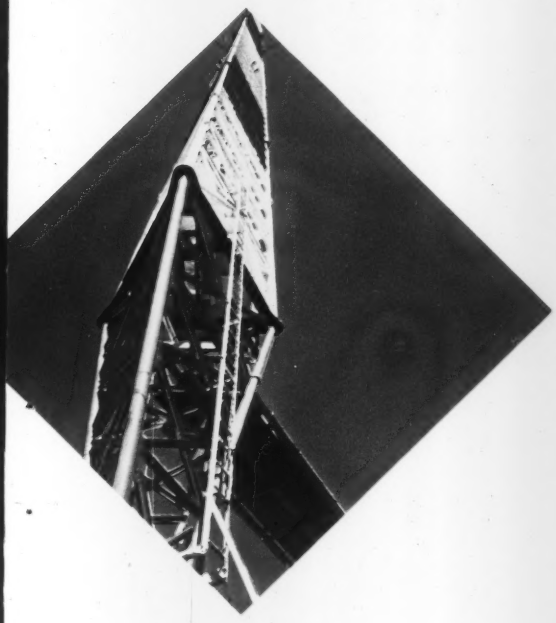
"T-1" Steel cuts cost 15% in 1,199-ft. TV Tower

THIS is the new 1,199-ft. WBZ-TV transmitting tower near Boston, Massachusetts. It's unique because up to the 838-ft. level its legs are of USS "T-1" Steel, a constructional alloy steel so strong it made possible significant savings for the tower owner. This structure was designed and built by Dresser-Ideco for Westinghouse Broadcasting Co., Inc.

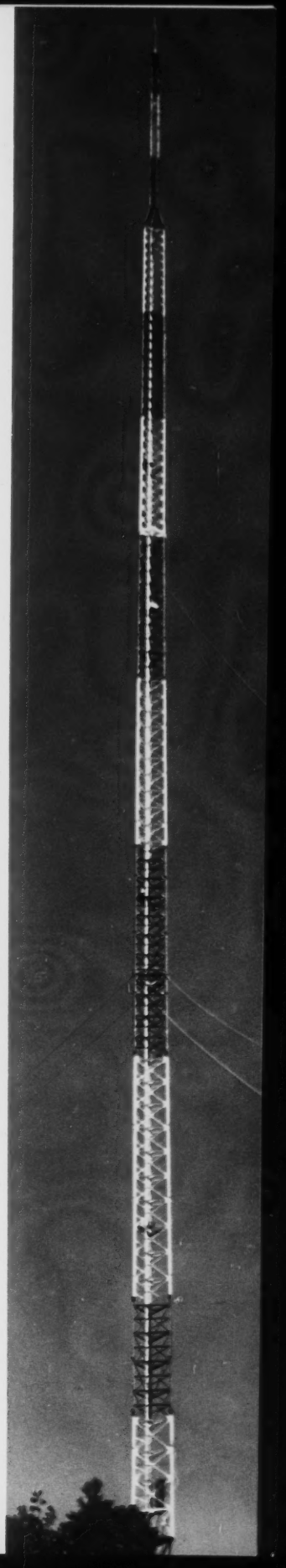
WBZ's tower presently supports a 6-bay channel 4 antenna, but future plans call for it to carry plenty of additional weight; pending FCC approval, another 300 feet of height will bring it to an ultimate 1,499 feet. The tower had to be built with the strength to accommodate this extra weight without the necessity of future structural modifications.



Round, hot-rolled, heat-treated bars of USS "T-1" Steel were used for the three legs up to the 838-ft. height because this alloy steel has nearly three times the yield strength of structural carbon steel. It therefore enabled Dresser-Ideco to reduce the size of the legs greatly, lowering shipping weight, welding costs, wind stresses and over-all weight and price. For example, consider the leg members at the bottom of the tower. Cross-sectional area of these "T-1" bars is only 56% of the area required with the usual structural carbon steel, resulting in a 44% material savings. Also saved: the cost of hot-forging and machining, since carbon bars of the size required for the biggest members are too large to be produced economically by hot-rolling. *Altogether, the builders estimate that "T-1" Steel cut the cost of this tower by 15%.*

For more information on USS "T-1" constructional alloy steel, contact any office of United States Steel (listed in all phone directories), or write United States Steel, 525 William Penn Place, Pittsburgh 30, Pa. For details about the column strength of "T-1," write for free booklet.

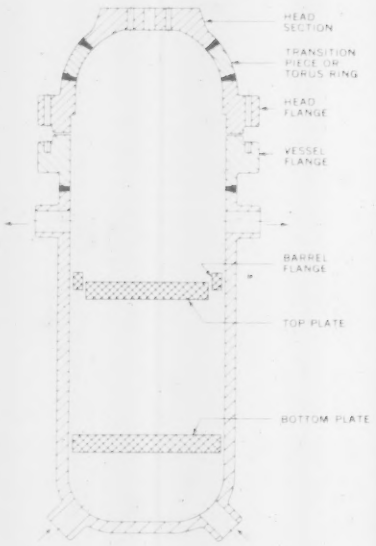
United States Steel



Critical-service reactor forgings "routine" at United States Steel

This closure-head forging for a nuclear reactor shell is a good example of how all United States Steel products are made to the tip-top edge of perfection. The reactor operates at very high pressure and is intensely radioactive. More than that, the entire shell, with its eight- to ten-inch-thick steel walls, is welded into a single, sealed unit. Can you imagine the prohibitive cost of replacing or repairing or even *examining* a forging that is in this type of service?

The small drawing shows a typical reactor vessel. "As-forged" diameters of the flange and transition forgings go up to 145 inches. They may be 30 to 50 inches thick, weighing up to 150,000 pounds in the rough. Head pieces, like the one in the big color picture, go up to 96 inches in diameter, 36 inches thick, 87,000 pounds.

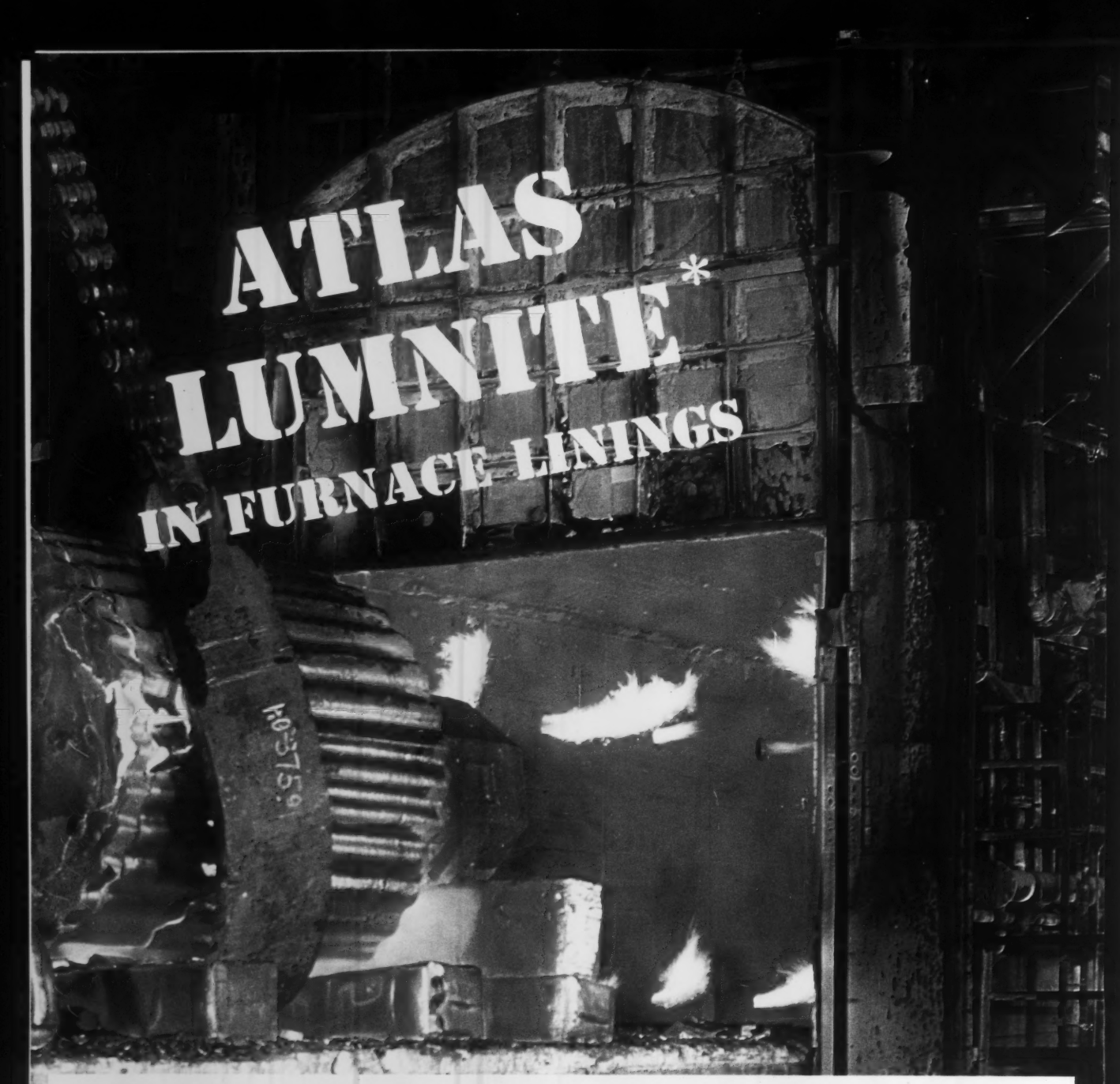


To make these mammoth forgings, we teem manganese-nickel-molybdenum killed steel ingots that may weigh a quarter-million pounds. The ingots are cogged, upset, punched and mandrel-forged (in the case of ring forgings) and are annealed, double normalized, and double tempered—a process that may take as long as 700 hours. Then comes the rough machining on vertical boring mills, and quench and temper heat treatment. Inspection procedures are elaborate: ultrasonic inspection, magnetic particle inspection, plus tangential tensile, Charpy V notch impact, grain size and bend tests.

It's no surprise that so many builders of nuclear equipment specify and depend on USS Quality Forgings. The men of our Homestead Forgings Division who produce these parts have had a great deal of experience turning out equally critical forgings, such as the perfectly balanced shafts for steam turbines and generators. Critical work like this is routine, and perfection is a habit for the men who make USS Quality Forgings.

You get this same quality in *any* forging you order, because the same crew of highly skilled men work on every order, using the same steelmaking facilities and the same shop equipment. If you specify a USS Quality Forging, you can be sure that money won't buy anything better. We'd appreciate your inquiries or requests for our free 32-page booklet on USS Quality Forgings. Write to United States Steel, Room 2801, 525 William Penn Place, Pittsburgh 30, Pa.

USS United States Steel



Refractory concrete linings, containing LUMNITE cement, give excellent service in car-bottom forge furnaces, Homestead Works, United States Steel Corporation, Munhall, Pa. Packaged castable used: Laclede-Christy "Steel Cast," product of Refractories Division, H. K. Porter Co., Inc. Operating temperature: 2200°F.

- Refractory concrete furnace linings made with LUMNITE cement resist extreme variations in temperature and thermal shock due to rapid heating and cooling.
- Construction is fast and easy . . . simply pour refractory concrete into forms . . . service strength is reached within 24 hours.

For maximum convenience, use castables made with LUMNITE cement. These are packaged mixtures, ready for use. Just add water, mix and place. Made and distributed by leading manufacturers of refractories.

For more information, write: Universal Atlas, 100 Park Avenue, New York 17, N. Y.

*"LUMNITE" *is the registered trademark of the calcium-aluminate cement manufactured by Universal Atlas Cement Company*

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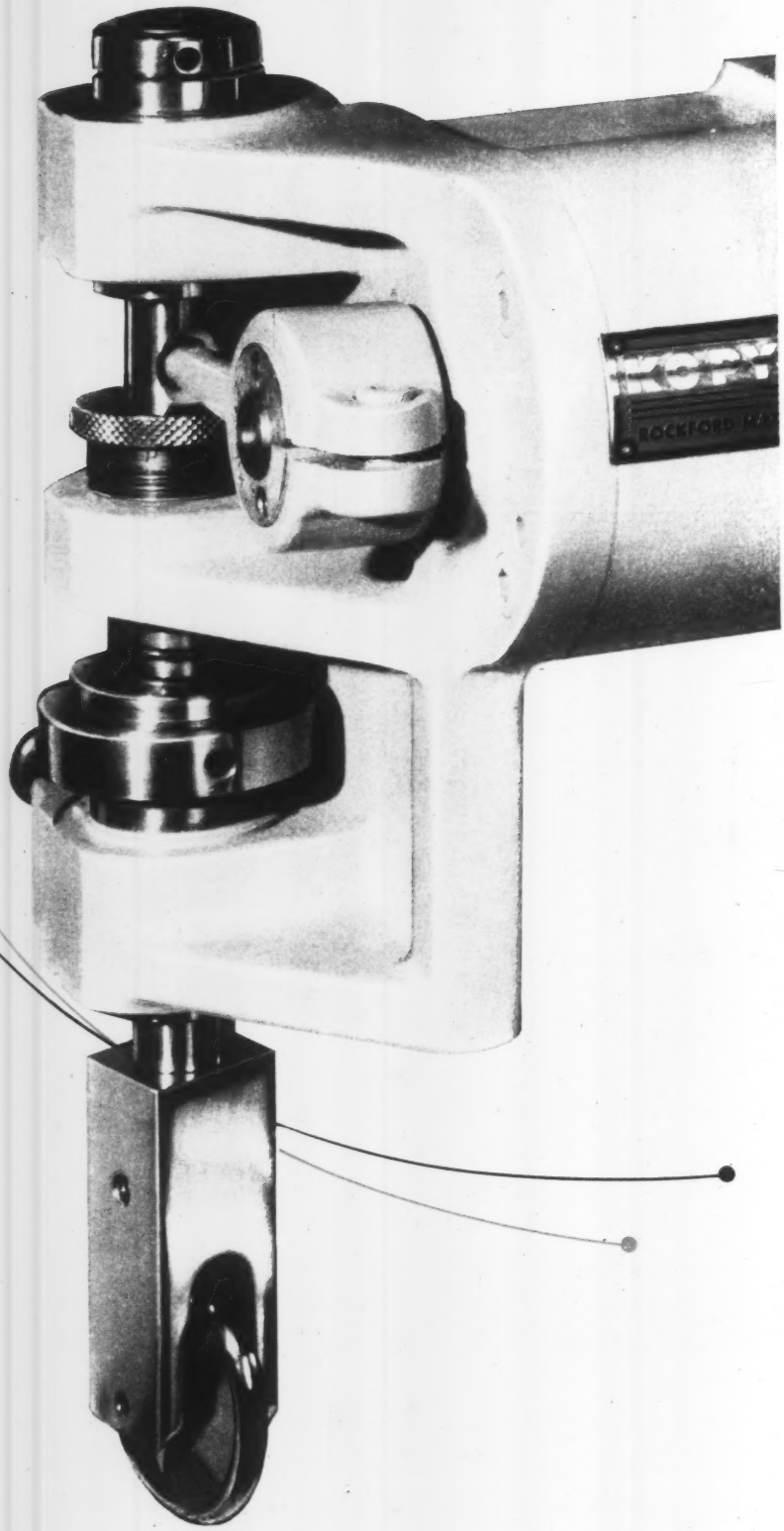
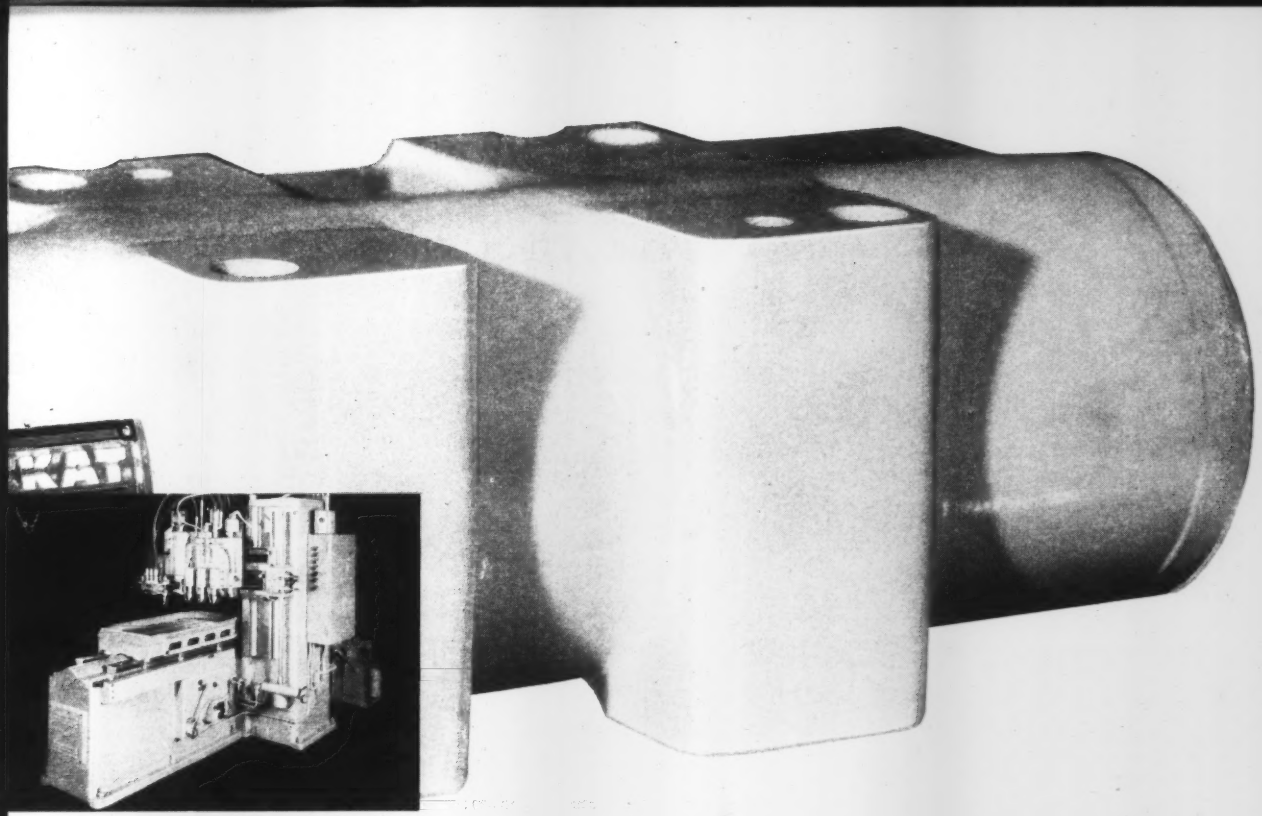
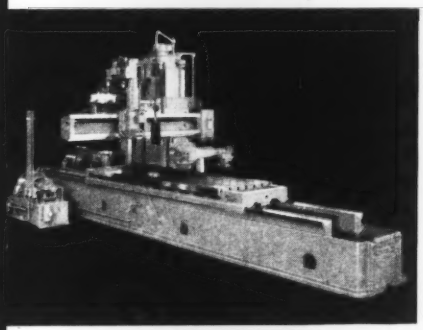
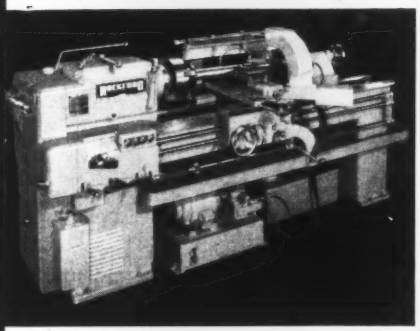




Hydraulic Openside Shaper



Hydraulic Openside Planer



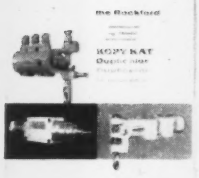
Rockford Tracer Lathe

The versatility of the Kopy-Kat Duplicator is continually solving duplicating problems in many production machining shops. Its amazing sensitivity, power and precision, coupled with the efficiency of Hydraulic Shapers, Planers, Slotters, Shaper-Planers . . . . and Lathes, saves many hours in set-up and production time.

Kopy-Kat Duplication is direct hydraulic transfer with no intermediate motions, completely automatic, and as a result chances for error or irregularities in the final work are greatly reduced.

The Kopy-Kat Duplicator is specifically engineered for application on Hydraulic Shapers, Planers, and Slotters, and it becomes an integral operating part of any machine on which it is installed. Form tolerances are precisely held through the sensitivity of the Kopy-Kat selector valve.

When you are considering form machining, be sure to check all of these advantages on a Kopy-Kat equipped machine.



get the facts . . .

completely described in this new Bulletin 1300. Request on your letterhead will bring you a reply promptly.

A new motion picture film "The Rockford Kopy-Kat" is also available through your local distributor.

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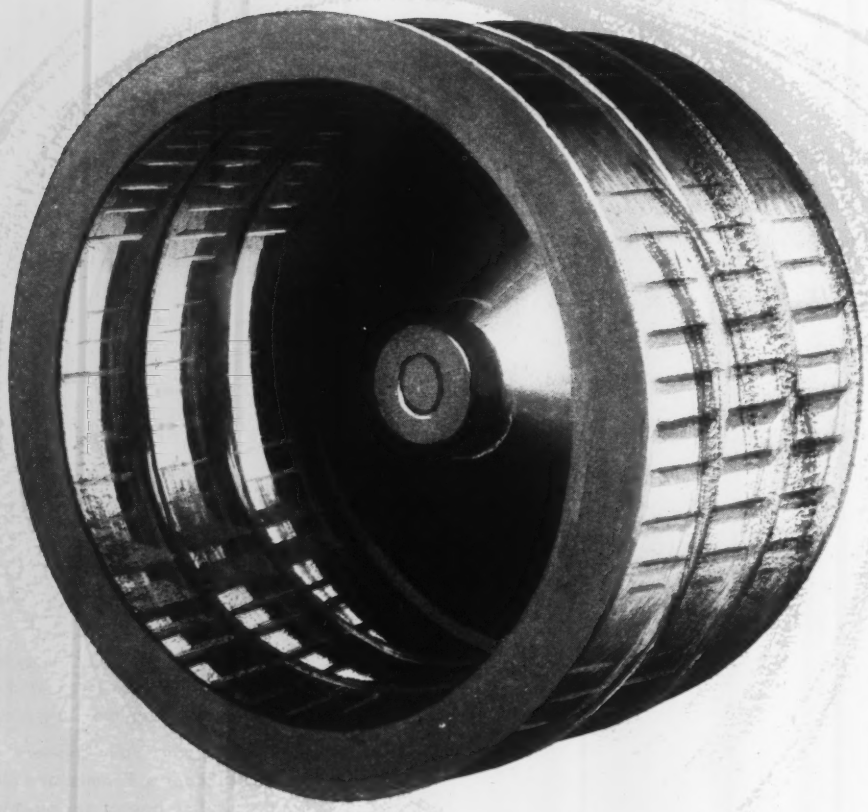
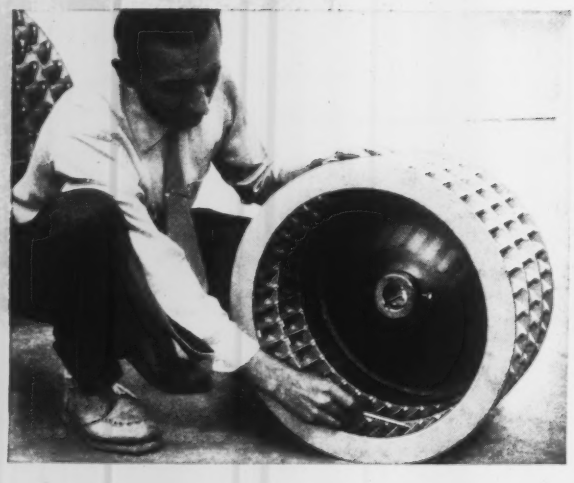
HAYNES Alloys solve the



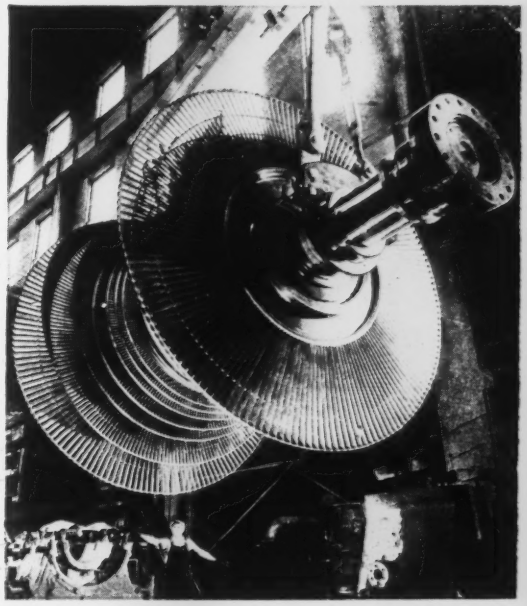


HEAT

10 Years' Service at 1600 to 1800 deg. F.

Rotors and impellers made of MULTIMET alloy are being used to circulate the atmosphere inside heat-treating furnaces where temperatures range from 1600 to 1800 deg. F. They are expected to last 10 years even though they are exposed to both reducing and oxidizing conditions.

tough problems



EROSION

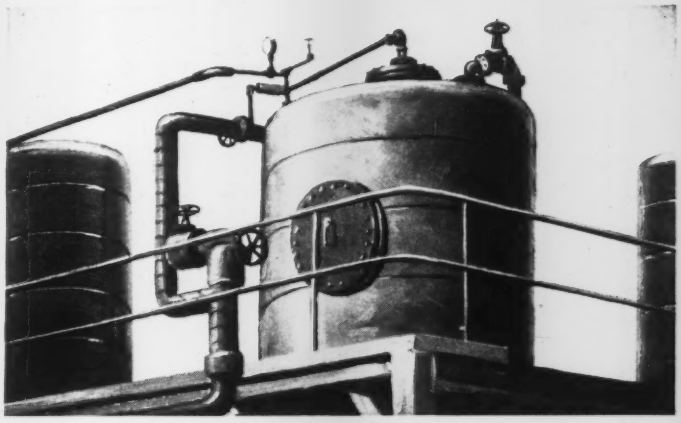
Withstands High Velocity Erosion for 19 Years

Blading at the cold end of steam turbines spins at speeds approaching that of a high speed bullet. At these high velocities even small water particles can cause rapid wear on most metal parts. Yet when the leading edges of these blades are protected by a 27-in. strip of HAYNES STELLITE alloy, they remain in operation up to 19 years!

HAYNES alloys give long, dependable service under some of industry's toughest conditions. They operate for long periods of time at temperatures up to 2000 deg. F; they resist the severe corrosive action of many chemicals; and they withstand the wearing effects of abrasion and erosion.

There are over 100 HAYNES alloys—a wide selection that practically guarantees you a tailor-made solution to your heat, abrasion, or corrosion problems. Many of these alloys are available as sheet, plate, bar stock, tubing, wire, sand castings, investment castings, welding rods, hard-facing rods, and metal-cutting tools.

For complete details on properties, prices, and forms, write for literature, or contact our nearest sales office... HAYNES STELLITE COMPANY, Division of Union Carbide Corporation, Kokomo, Indiana. Sales Offices in Chicago, Cleveland, Detroit, Houston, Los Angeles, New York, and San Francisco.



CORROSION

Resists Chlorine Compounds at 300 deg. F.

Vessels lined with HASTELLOY alloy C last from 2 to 4 years while handling such severely corrosive media as hydrochloric acid, tri-chlor benzene and other chlorine compounds. Because of the unusual resistance of HASTELLOY alloy C to a variety of corrosives, it is widely used in the Petroleum, Chemical Processing, Metalworking, and many other industries.

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"Our Schiess vertical boring mill DOES THE JOB 3 TIMES FASTER, MORE ACCURATELY, with a BETTER FINISH!"

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"Our operators claim the machine is just about foolproof. They like the cross-rail electro mechanical controls. They also praise the hydraulic pre-selection of speeds, the finger-tip control for direction of feed and rapid traverse, and the all-vertical gear drive. Another thing—no special training was needed. Our regular machinists put it right to work as soon as they learned the controls.

"The Schiess mill does our big jobs just about three times faster, provides a better finish, is more accurate and results in less spoilage."

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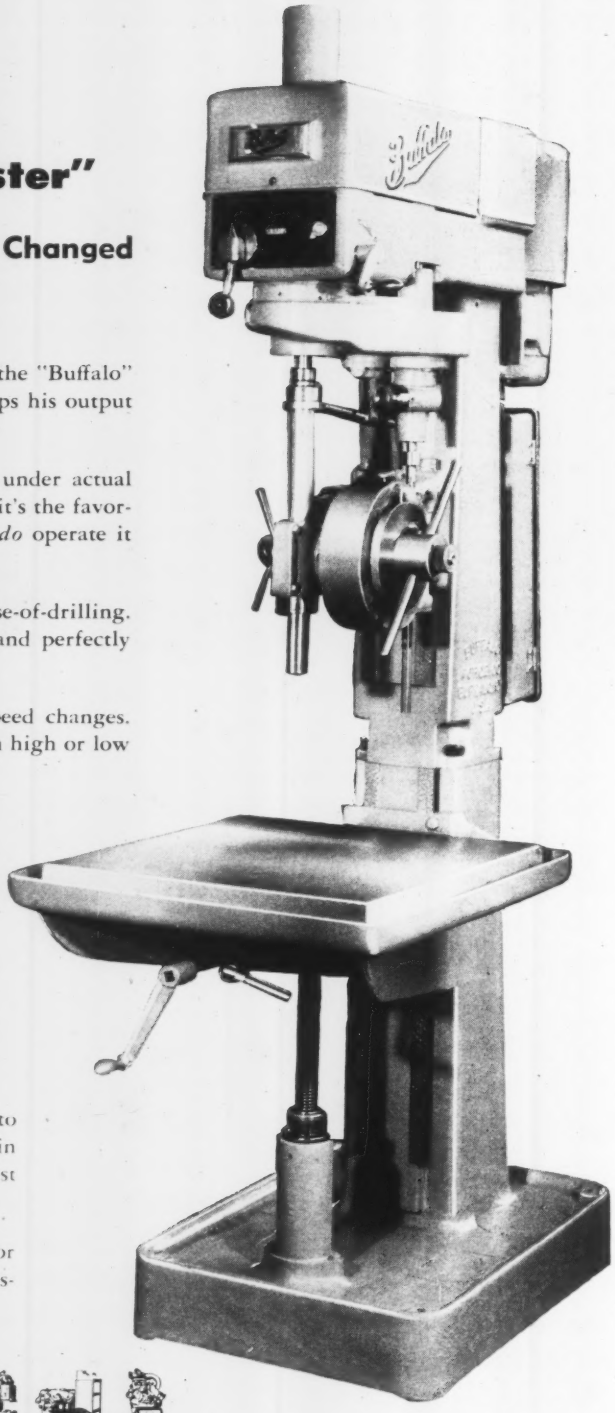

Check with the man who uses one. He'll tell you why the "Buffalo" "RPMster" is the drill he *likes* to operate . . . how it ups his output . . . improves the quality of his work.

Because you have to operate this machine yourself — under actual shop conditions — before you'll really understand why it's the favorite of shopmen and supervisors alike. Only when you *do* operate it will you discover its many exclusive advantages.

One of these is extreme smoothness, quietness and ease-of-drilling. That's the result of the gearless variable speed drive and perfectly fitted spindle.

Another "RPMster" advantage is the instantaneous speed changes. The shift lever at the left of the head places the drive in high or low range. The dial at the right provides infinite speed variations in either range. These handy controls adjust precisely to speeds ranging from 100 to 3000 RPMs, for all your drilling, reaming and tapping operations.

Sturdily built for a long life of accurate, maintenance-free service, the "RPMster" is available in one- to six-spindle models. And, considering all the unique versatility it can add to your production and shop jobs, you'll find that it's mighty economical, too.

Try the "Buffalo" No. 1 "RPMster", and you'll want to put one or more of these outstanding drills to work in your plant. For a demonstration, contact your nearest "Buffalo" machine tool dealer — or write us today.

The "Buffalo" "RPMster" features the famous "Q" Factor — the built-in Quality which provides trouble-free satisfaction and long life.

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5% greater production of steel balls

FROM KEYSTONE XL WIRE *flowability* IS THE SECRET

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Officials of the company report that the superior forming characteristics of Keystone "XL" Wire are in evidence in the initial stage of steel ball production. The steel balls are upset on a single blow, solid die cold-header. With Keystone "XL" Wire flowability, the amount of "flash" left on the newly produced steel balls is small – a mark of quality heading wire. Case hardened steel balls – perfect in diameter – like those shown above, are standard, high-speed production items when Keystone "XL" Wire is used.

If you are having trouble cold heading parts which are complicated in design, or which demand trueness of form, talk it over with your Keystone representative. He can show you how the uniform high quality of Keystone "XL" Wire can fulfill your requirements. See him soon for complete details, or write direct.

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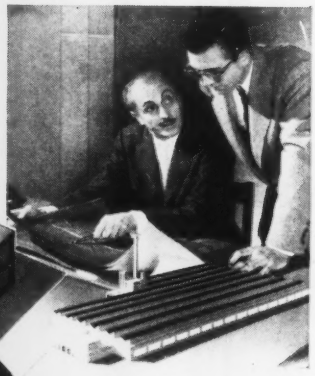
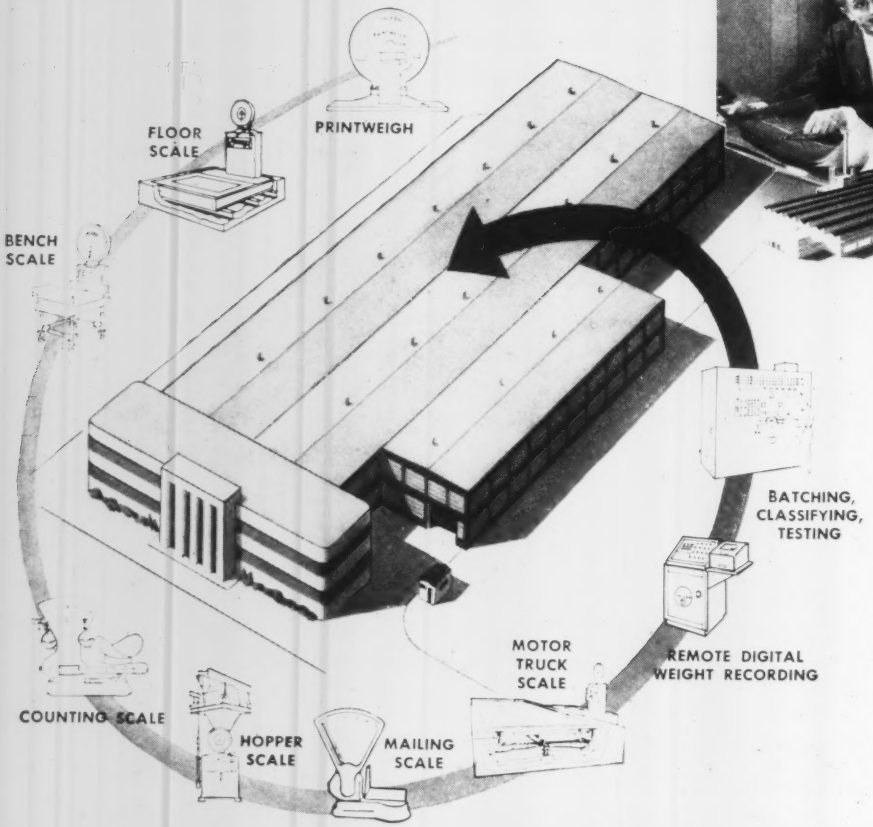
Studying Costs? It pays to start with a Plant-Wide Look at WEIGHING!





You can lessen the impact of rising costs by making sure your scales are doing the best possible job. Remember that weighing today is not a job for isolated scales—it's a vital element in your overall cost control system.

Weight records affect costs, quality, inventory control and customer billing. Weighing errors, or inadequate weight data, can be avoided by having the right scales in the right places . . . all carefully integrated in a plant-wide weighing system to supply basic records on materials received, shipped or transferred. Check your needs now! TOLEDO SCALE Div. of Toledo Scale Corp., 1422 Telegraph Road, Toledo 13, Ohio.

TOLEDO SCALE *Headquarters for Weighing Systems*

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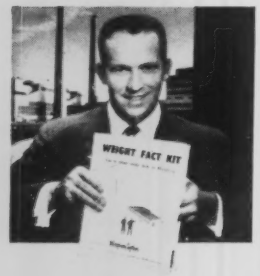

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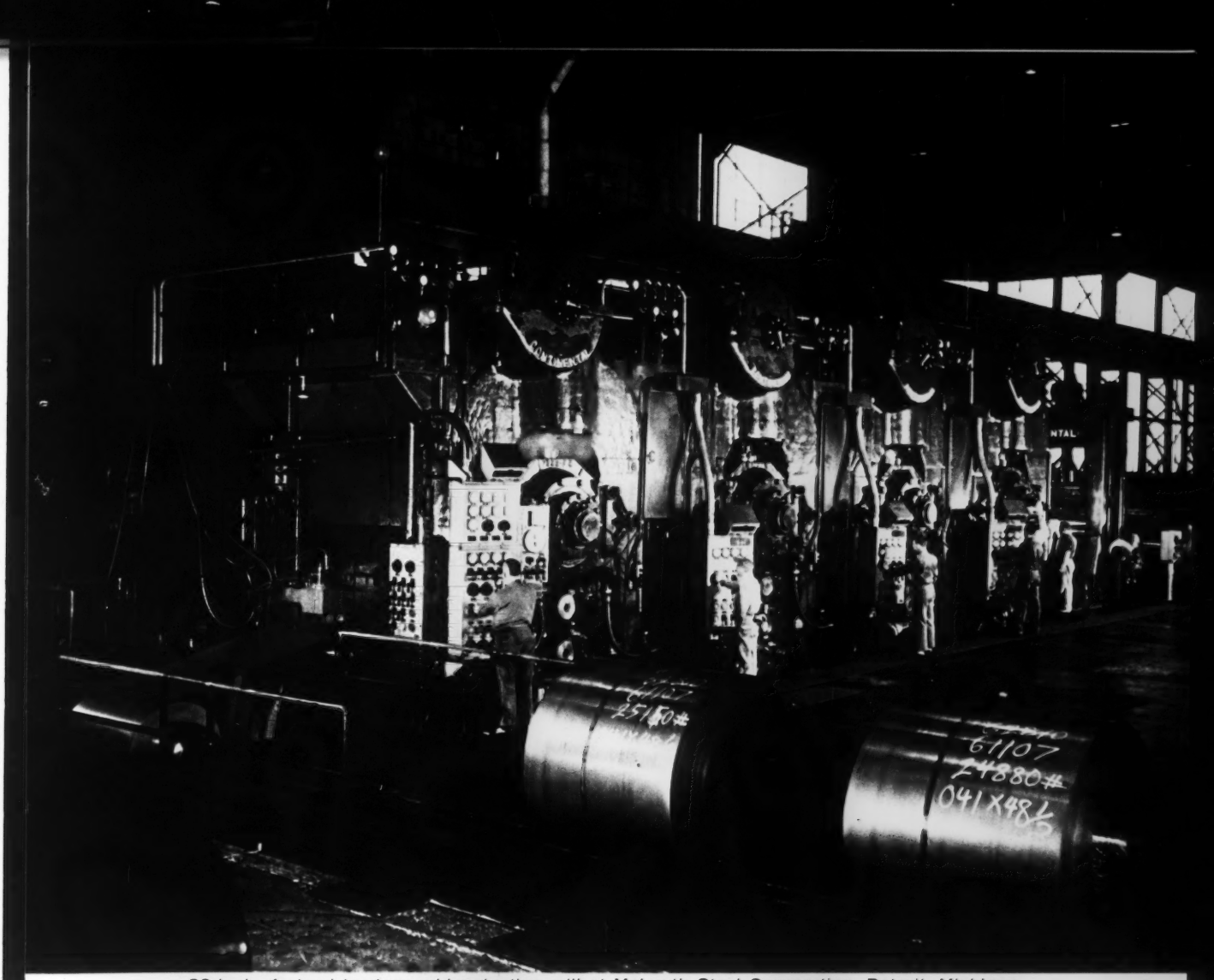

60-inch, 4-stand tandem cold reduction mill at McLouth Steel Corporation, Detroit, Michigan

BLAW-KNOX
COLD STRIP MILLS

Blaw-Knox designs and builds all types of cold reduction and temper mills for ferrous and non-ferrous work. Other Blaw-Knox equipment for the metals industry includes complete rolling mill installations including all auxiliary equipment for ferrous and non-ferrous metals, iron, alloy iron and steel rolls, Medart cold finishing equipment, carbon and alloy steel castings, fabricated steel plate or cast-weld design weldments, steel plant equipment, and heat and corrosion resisting alloy castings.

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Foundry and Mill Machinery Division
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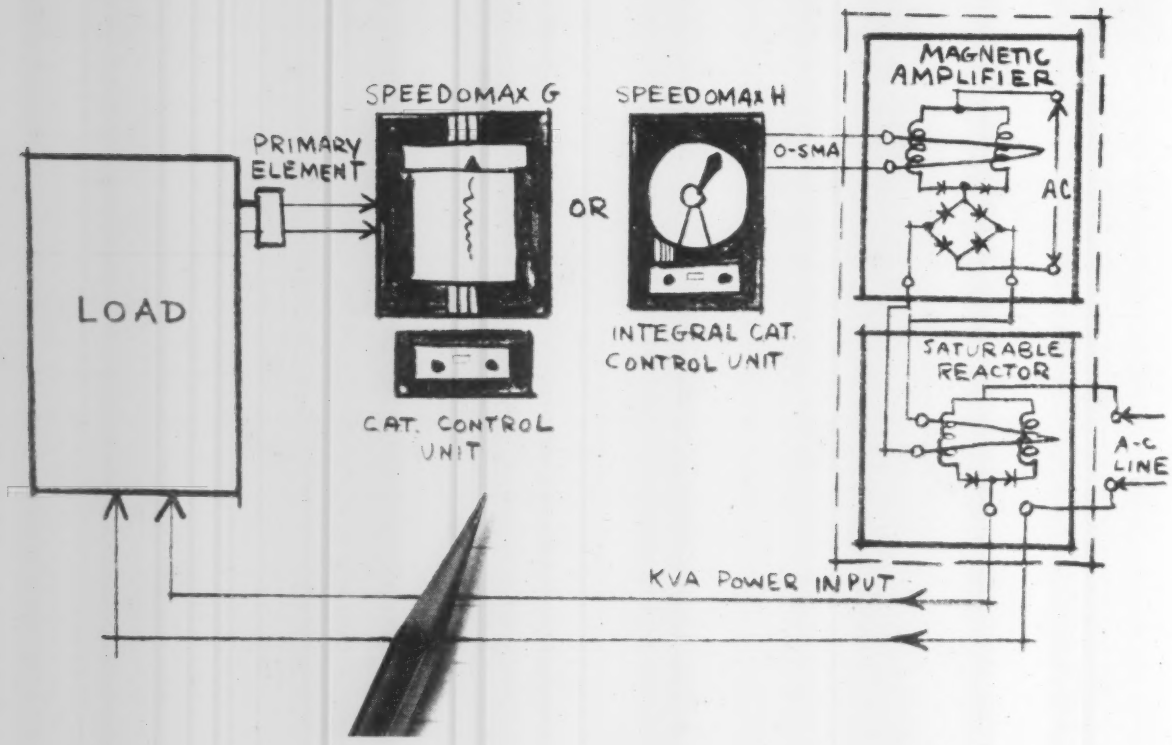

Now...Stepless control of Electric Heat Input with L&N's new C.A.T. control system

If your process uses electric heating equipment and your product is off-temperature due to cycling of heating elements at high temperatures . . . if excessive downtime and expensive replacement of worn-out contacts cut down production time . . . it'll pay you to learn about L&N's new Current-Adjusting Type control for continuous, efficient power output in saturable core reactor systems.

Already in use on applications like crystal growing and strip annealing, this control permits stepless regulation of power output over the *entire operating range of saturable core reactors.* Its rapid speed of response matches rapid changes in product temperature. The wide range of adjustment of proportional, reset and rate actions facilitates tuning the system to your process, product and production.

C.A.T. control is a complete system consisting of (1) a primary element, (2) Speedomax® recorder, (3) C.A.T. control unit, and (4) a magnetic amplifier and saturable core reactor.

Heart of the system is the C.A.T. control unit. Any temperature change, detected by the primary element and measured by the recorder, is fed to the control unit. Continuous d-c output of the unit over 0 to 5 ma range drives a magnetic amplifier. The d-c output of the magnetic amplifier is fed to the control windings of a saturable core reactor for continuous regulation of power input to the process.

If you're modernizing your present electric process equipment or installing new—make use of our wide experience in providing temperature control systems for thousands of applications. For more information, contact your nearest L&N sales office, or write us at 4957 Stenton Ave., Philadelphia 44, Penna. Ask for Data Sheet ND 46-33(107).

LEEDS NORTHRUP
Instruments Automatic Controls • Furnaces

Fasteners made Stainless at low cost

Standard Industrial Fasteners and Other Steel Products Given Stainless Properties by the Modern Miracle in Metallurgy

ASC Metal Diffusion is a revolutionary new process that actually interchanges iron and chromium atoms to produce a chromium-rich surface that is an integral part of the parent metal. Not a plating, coating or cladding. Will not craze, crack, peel or chip. Resists wear. Resists corrosion. Resists heat. Good dimensional stability.

Easy-to-fabricate stock items can be up-graded to meet your own or your customers' demands for stainless qualities at reasonable prices. Send us samples of your fasteners — machined, stamped, upset or cast. We will process them at no cost to you. Write us today.

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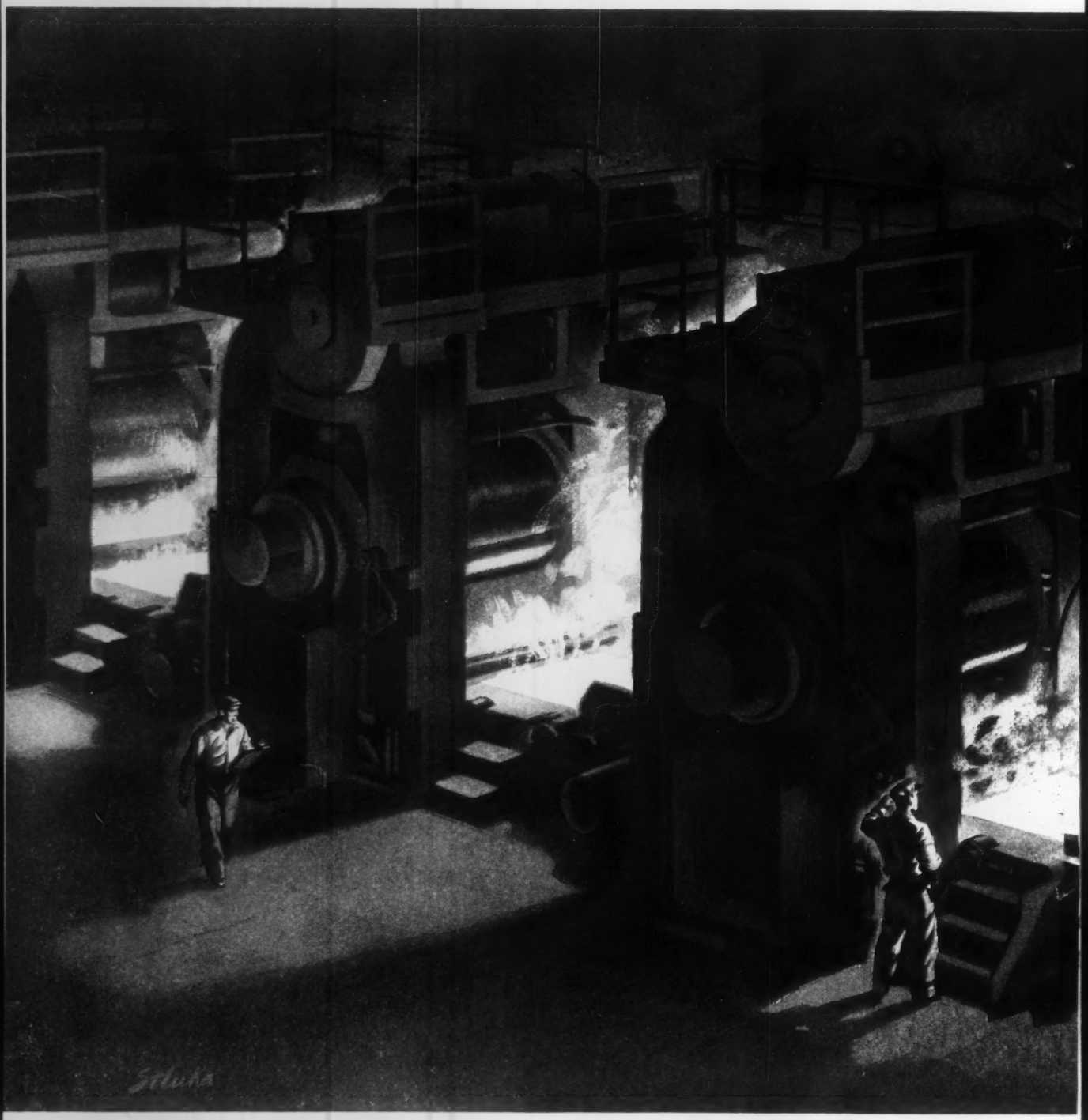
ALLIS-CHALMERS.

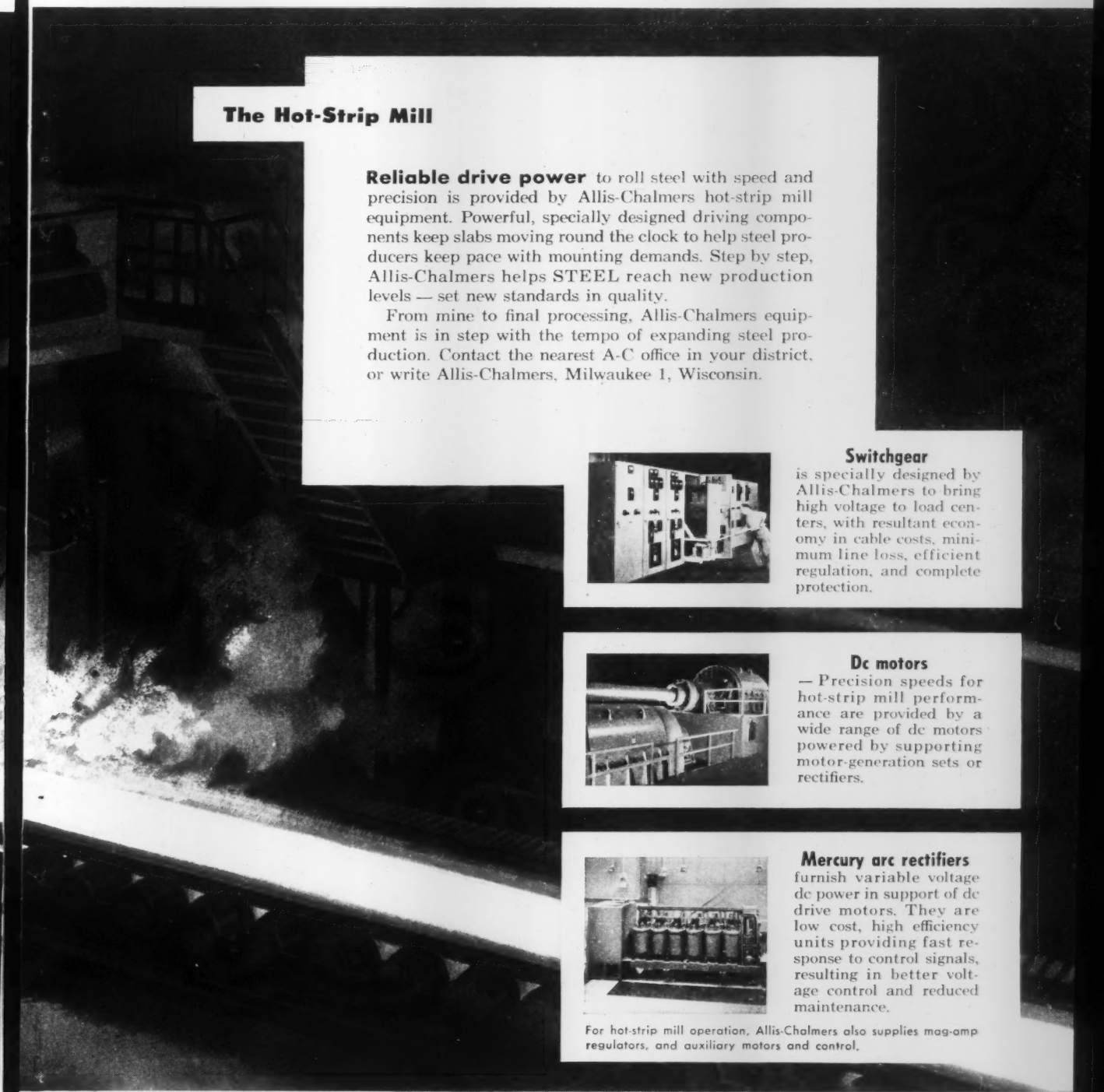


Products for steel: motors, m-g sets, rectifiers, control, pumps, *Texrope* drive equipment, crushers, grinding mills, screens, transformers, unit substations, switchgear, circuit breakers, turbine-generators, voltage regulators, blowers, compressors, condensers, and water conditioning equipment.

Texrope is an Allis-Chalmers trademark.

ALLIS-

. in Step with STEEL



The Hot-Strip Mill

Reliable drive power to roll steel with speed and precision is provided by Allis-Chalmers hot-strip mill equipment. Powerful, specially designed driving components keep slabs moving round the clock to help steel producers keep pace with mounting demands. Step by step, Allis-Chalmers helps STEEL reach new production levels — set new standards in quality.

From mine to final processing, Allis-Chalmers equipment is in step with the tempo of expanding steel production. Contact the nearest A-C office in your district, or write Allis-Chalmers, Milwaukee 1, Wisconsin.

Switchgear is specially designed by Allis-Chalmers to bring high voltage to load centers, with resultant economy in cable costs, minimum line loss, efficient regulation, and complete protection.

Dc motors — Precision speeds for hot-strip mill performance are provided by a wide range of dc motors powered by supporting motor-generation sets or rectifiers.

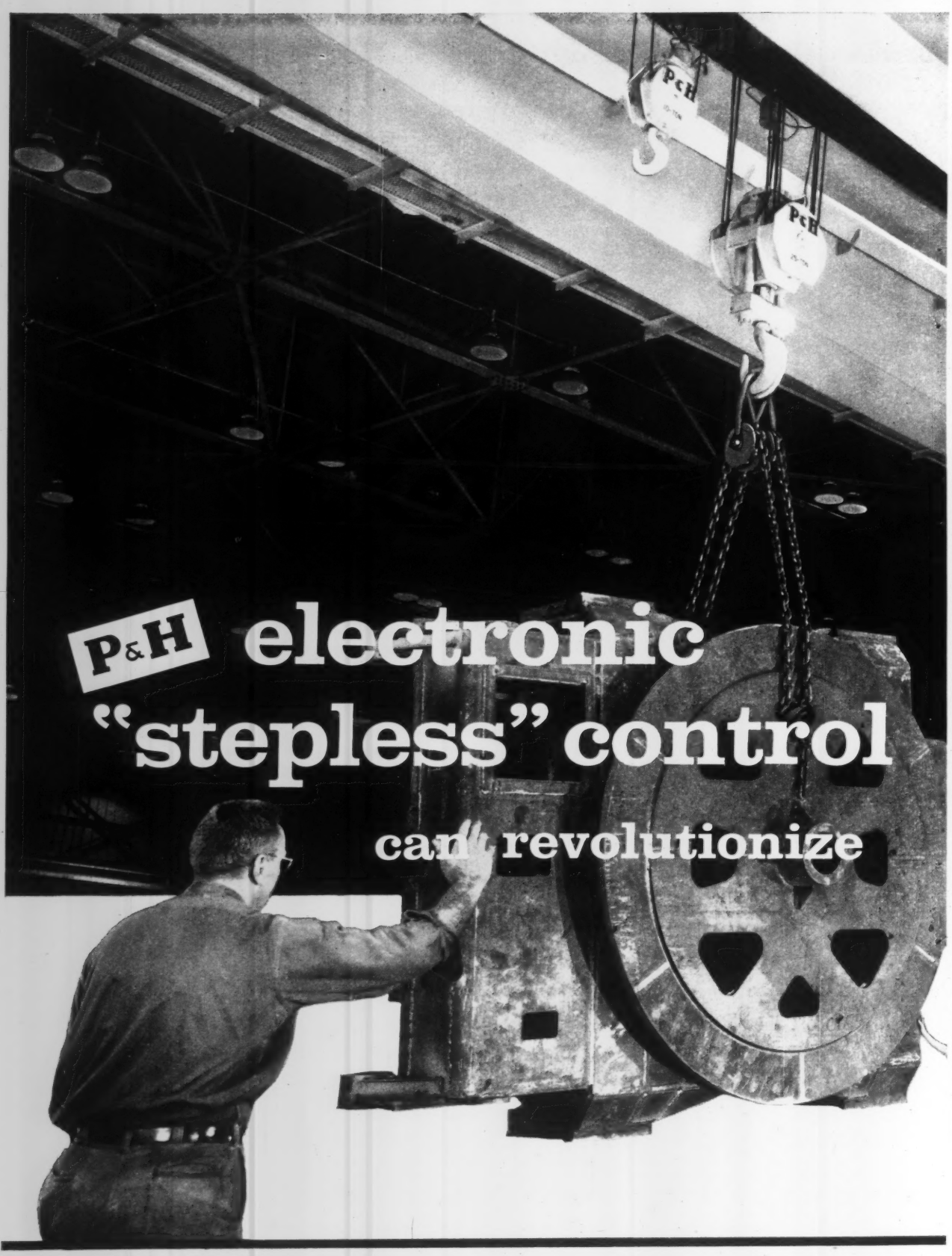
Mercury arc rectifiers furnish variable voltage dc power in support of dc drive motors. They are low cost, high efficiency units providing fast response to control signals, resulting in better voltage control and reduced maintenance.

For hot-strip mill operation, Allis-Chalmers also supplies mag-amp regulators, and auxiliary motors and control.

CHALMERS

A-C ALLIS-CHALMERS

A-5413


P&H electronic
"stepless" control
can revolutionize

your crane operation!

P&H Electronic "Stepless" Crane Control can help you lower the cost of handling materials through the air. Available only from P&H, this remarkable new control marks the greatest advance in overhead crane design in over a decade.

Proved reliable by more than 450 installations in all types of industries, this outstanding control permits smoother, faster, more precise crane operation. Giant loads can be moved quickly and safely with fingertip ease — and spotted with pin-point accuracy.

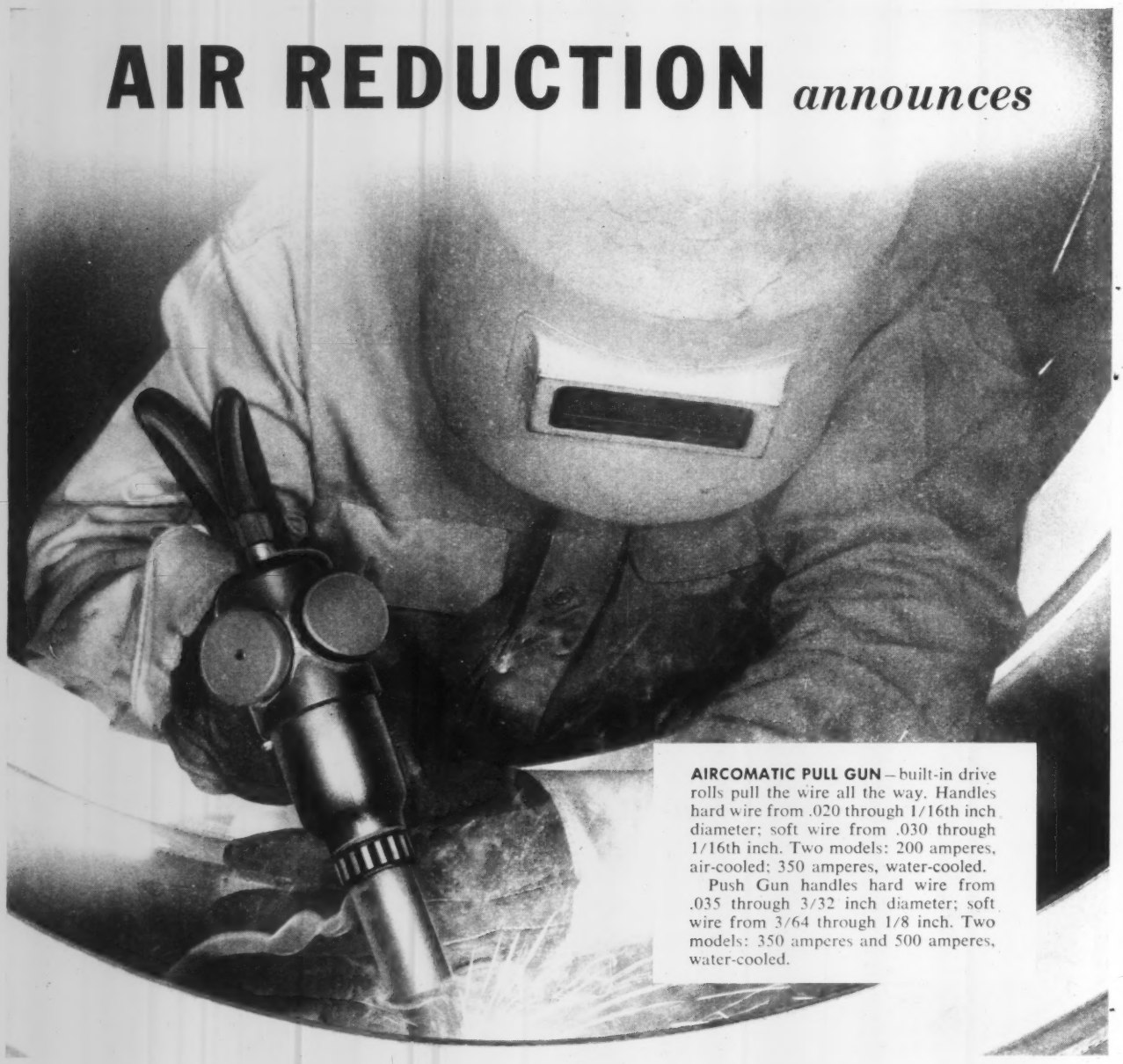
P&H Electronic Control has a simple wiring circuit that eliminates 58 contacts — points of heavy wear found on other crane controls. The results: fast servicing, less down-time, and drastically reduced protective parts inventory.

The same unit fits all size cranes, and works on AC cranes of *any* make. Investigate the many advantages P&H Electronic Crane Control holds for you. For information write Dept. 104E, Harnischfeger Corp., Milwaukee 46, Wisconsin.

HARNISCHFEGER

P&H ...quality and service for 74 years

AIR REDUCTION *announces*

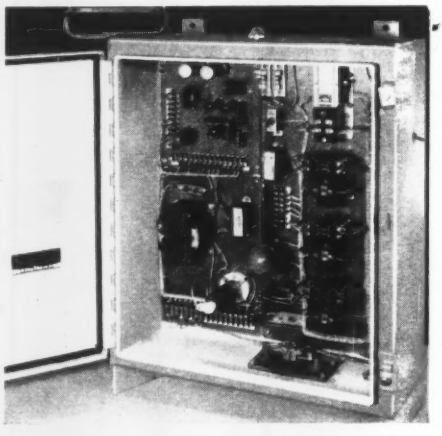


AIRCOMATIC PULL GUN—built-in drive rolls pull the wire all the way. Handles hard wire from .020 through 1/16th inch diameter; soft wire from .030 through 1/16th inch. Two models: 200 amperes, air-cooled; 350 amperes, water-cooled.

Push Gun handles hard wire from .035 through 3/32 inch diameter; soft wire from 3/64 through 1/8 inch. Two models: 350 amperes and 500 amperes, water-cooled.

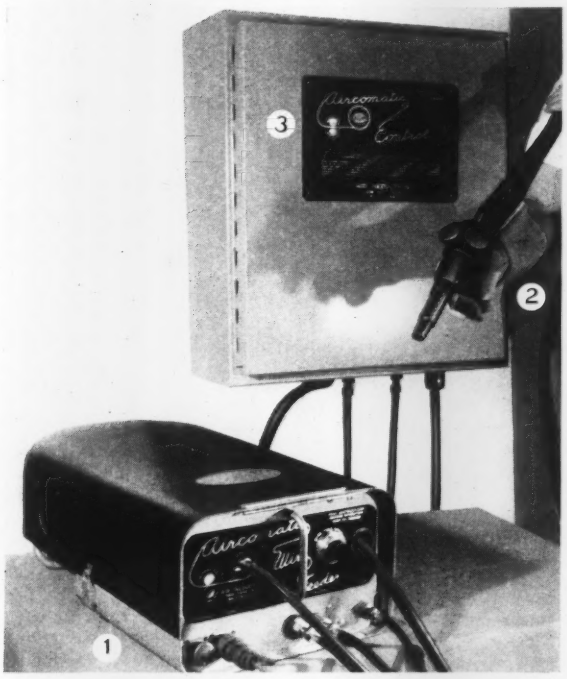
AIRCOMATIC WIRE FEEDER—shown here with cover removed. Motor compartment at left, bracket support for wire at right, reel deck at rear. Note speed control knob and carrying handle on front of unit. Model for use with Push Gun designed with drive rolls substituted for wire bracket. Adaptable for bulk wire system.

UNIVERSAL CONTROL PANEL—for permanent installation near welding power source. Components are easy to reach. Most are plug-in. All sub-assemblies packaged to be replaceable as sub-assemblies. Motor speed control circuits printed on their mounting panel. High efficiency, low maintenance features such as these are typical of the 1958 AIRCOMATIC units.



the new **AIRCOMATIC®** *package...*
most flexible welding system in the industry

- **push or pull operation—to handle wide range of wire diameters**
- **welds from 1/16" aluminum sheet up**
- **compact, portable—operates up to 100 feet from control panel**
- **stepless self-regulating speed control**



MAIN COMPONENTS of the new Aircomatic package.

1—Portable Aircomatic Wire Feeder, adaptable for push or pull operation; can go anywhere a man can go, up to 100 feet from the control panel.

2—Aircomatic Pull Gun; or, for larger wire, the No. 21 Standard Aircomatic Push Gun (not shown).

3—Universal Control Panel, designed so that every element you ever have to handle is readily available for instant inspection.

The new AIRCOMATIC package, developed by Air Reduction engineers, now enables you to select a system that meets your exact welding needs.

Rugged heart of the system is the electronically controlled AIRCOMATIC WIRE FEEDER, which can be adapted to either pull or push operation.

Teamed with the Wire Feeder is the new AIRCOMATIC PULL GUN, designed particularly for small diameter wires . . . and the No. 21 AIRCOMATIC PUSH GUN, designed for heavier operations.

Completing the package is the all-new AIRCOMATIC UNIVERSAL CONTROL PANEL, featuring many advancements unique to such equipment.

In addition to the basic units, the 1958 Airco line includes remote speed controls, color coded wire guides, and kits for all guns and wire sizes.

Have you a tough application in mind? Send for literature. Then call your nearby Air Reduction sales office—and let a Technical Representative help you choose matched equipment to do the job.

AT THE FRONTIERS OF PROGRESS YOU'LL FIND . . .

AIRCO®

Offices in most principal cities

AIR REDUCTION SALES COMPANY

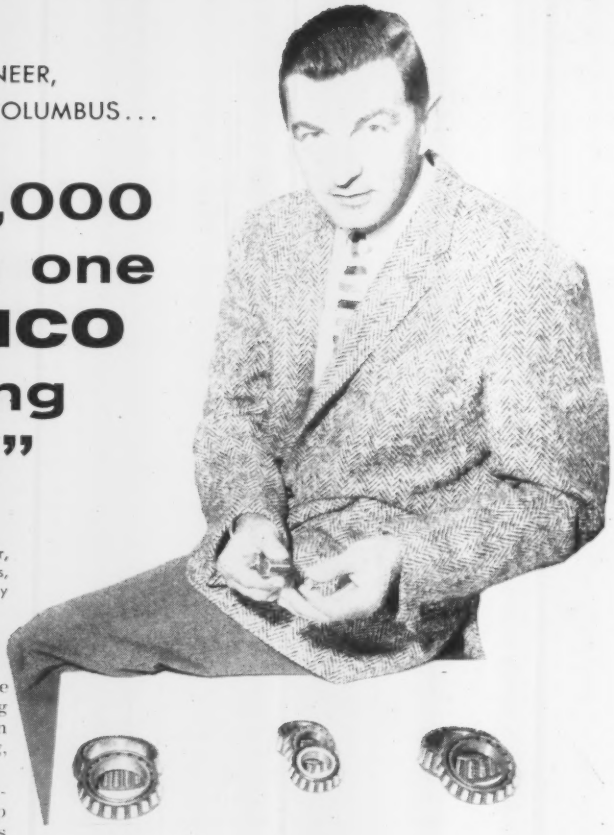
A division of Air Reduction Company, Incorporated
150 East 42nd Street, New York 17, N. Y.

On the west coast — Air Reduction Pacific Company
Internationally — Airco Company International
In Cuba — Cuban Air Products Corporation
In Canada — Air Reduction Canada Limited

Products of the divisions of Air Reduction Company, Incorporated, include: **AIRCO** — industrial gases, welding and cutting equipment, and acetylenic chemicals • **PURECO** — carbon dioxide — gaseous, liquid, solid ("DRY-ICE") • **OHIO** — medical gases and hospital equipment • **NATIONAL CARBIDE** — pipeline acetylene and calcium carbide • **COLTON** — polyvinyl acetate, alcohols, and other synthetic resins.

REPORT FROM THE ASSISTANT CHIEF ENGINEER,
THE TIMKEN ROLLER BEARING COMPANY, COLUMBUS...

"We process 4,000 lbs. of rollers in one load with ALMCO barrel finishing equipment"



MR. FRED ALBRIGHT, Assistant Chief Engineer, The Timken Roller Bearing Company, Columbus, displays rollers processed in two-ton batches by rugged Almco equipment.

AT COLUMBUS, OHIO, the Timken Company runs three shifts on rollers in a range of sizes. After heat treating and oil removal, rollers go to the Almco barrel section for cleaning-up of insert identification, radius polishing, and coloring.

Prior to this the Timken Company used other equipment, but it turned out to be a bottleneck that took up too much space. Maintenance costs were high, and its messy operation did not conform to the Company's high standards of plant housekeeping.

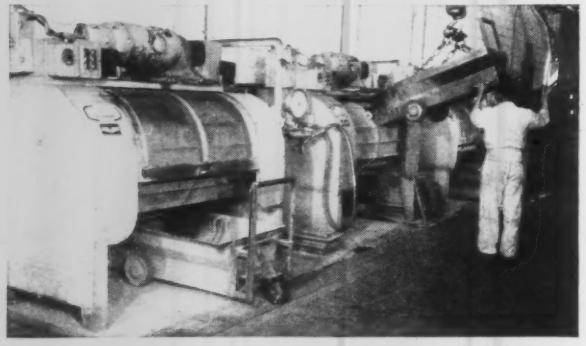
ALMCO SYSTEM REQUIRED 50% LESS FLOOR AREA — In cooperation with Timken Company engineers, Almco designed specially engineered heavy duty equipment for their system that raised output to production requirements . . . replaced the older equipment with a clean, controlled operation . . . and reduced floor area requirements by more than 50%.

BARRELS RE-LINED ONLY ONCE IN 2 YEARS! — These heavy-duty Timken tapered roller bearing equipped Almco machines and drive systems handle maximum loads at the Timken Company. Each two-compartment machine holds 16 pan-loads of rollers at an approximate weight of 250 lbs. per pan. This adds up to TWO TONS of rollers processed during each cycle!

It calls for equipment that will stand up under a punishing, round-the-clock production schedule. In this highly abrasive operation, Almco barrels at the Timken Company have been re-lined only *once* in two years!

LEARN HOW MODERN BARREL FINISHING CAN IMPROVE YOUR PRODUCT — The facilities of Almco's new, technician-staffed lab in Albert Lea, Minnesota are available to you without obligation. We will study your product parts, run exhaustive tests, and give you a factual report on the equipment and procedures best for your operation.

If you are interested in improving product quality and appearance, saving manpower and reducing your deburring and finishing costs, send your sample parts and specifications to the Almco lab. Or write on your company letterhead requesting an Almco engineer to visit your plant.



Cooperation between Timken Company and Almco engineers has resulted in efficient Almco installations in other Timken Company plants. The Timken Company at this time has a total of twelve DB-400 units and a DB-50. Minimum space is required for high-volume production . . . plant floor stays clean and safe.

SEND FOR YOUR FREE HANDBOOK OF BARREL FINISHING

52 pages of case history facts and barrel finishing processes. Illustrated equipment section. Includes detailed cost chart on finishing of typical parts. Send for your free copy today.

ALMCO

DIVISION OF QUEEN STOVE WORKS, INC.
152 Marshall Street • Albert Lea, Minnesota

Sales Engineering Offices in Chicago, Detroit, Los Angeles, Newark, New Haven, Philadelphia and London, England.

Advantages for You

IT ALL COMES DOWN to one fact...that you can always count on Roebling high carbon flat spring steel to reduce preparation time, machine stoppages and rejects to a minimum. What's more, it's made as you want it... annealed, hard rolled untempered, scaleless tempered, tempered and polished, blued or strawed.

You pay for the best every time you buy flat spring steel. Make sure you *get* it. Specify Roebling. Write Wire and Cold Rolled Steel Products Division, John A. Roebling's Sons Corporation, Trenton 2, New Jersey.

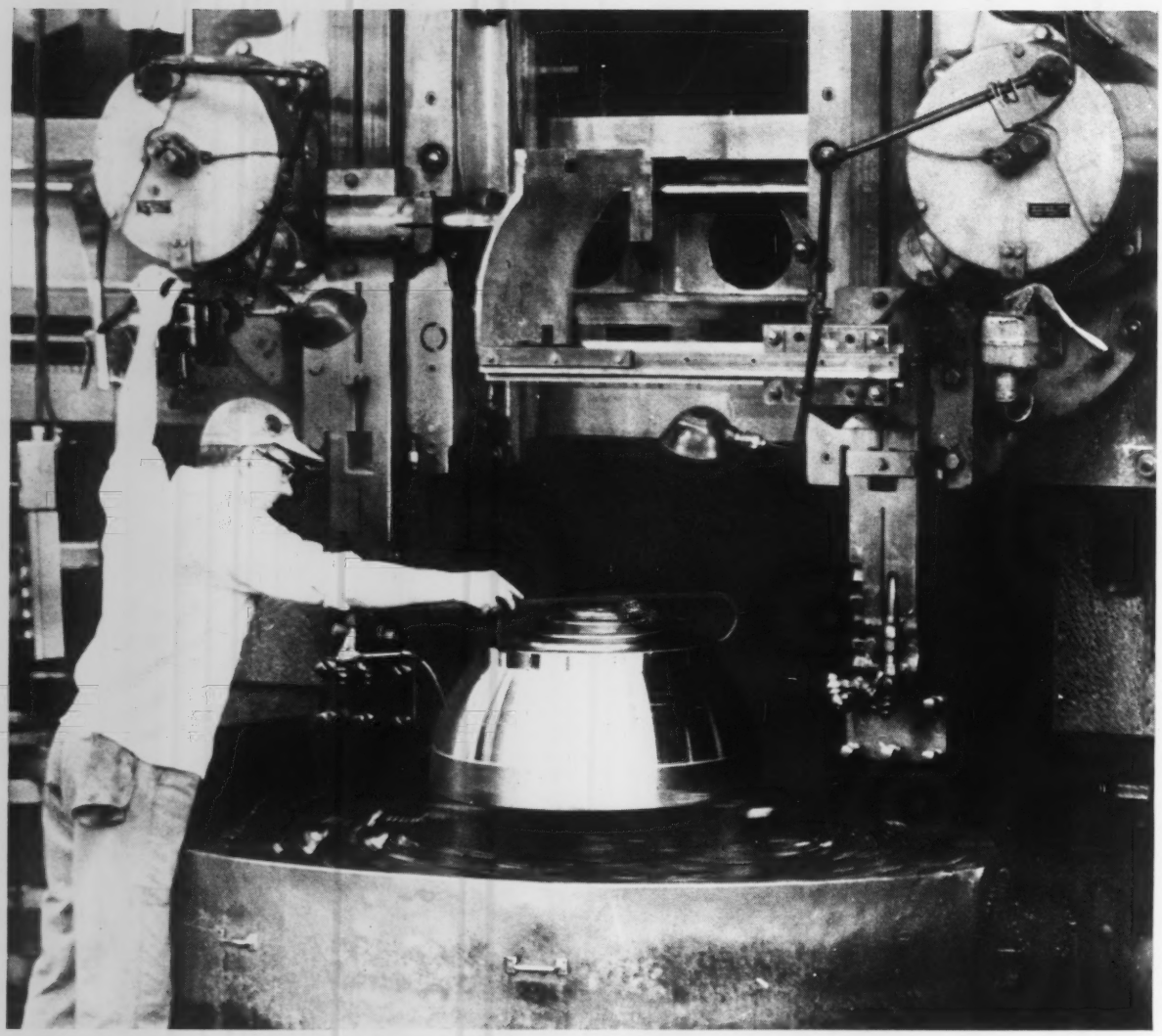
A few of the thousands of high-quality items made from superior Roebling cold rolled steel.

ROEBLING

Branch Offices in Principal Cities
Subsidiary of The Colorado Fuel and Iron Corporation

Roebling... Your Product is Better for it

PHOTO BY MC MANUS



Contour machining of an aft dome for a U.S. Army missile.

FOR MISSILES HARDWARE . . . investigate our ingenuity and ability to produce in a hurry

We have delivered aft dome rings, nozzles and sustainer parts in time to meet the most exacting requirements for production and test firing. We won't promise in advance we can solve all your missiles hardware problems on a quick delivery basis. But we invite you to look into our unusual service. Standard Steel Works boasts the facilities to produce anything—forgings and rings from 4130 aircraft quality analysis or special to-order analyses—*in a hurry*.

Man is beginning to conquer outer space. Standard is ready to play its part in this history-making achievement. We think you will find our combination of personalized service and know-how unique in the steel industry. Write Dept. 2B.

Standard Steel Works Division

BALDWIN · LIMA · HAMILTON

BURNHAM, PENNSYLVANIA

Rings • Shafts • Car wheels • Gear blanks • Flanges • Special shapes

BALDWIN BLH LIMA-HAMILTON

look your problem in the eye

No need to scratch around for a solution to your grinding wheel problems. Switch to CINCINNATI (PD)° WHEELS. For *now* CINCINNATI GRINDING WHEELS offer POSITIVE DUPLICATION—a remarkable achievement in precision manufacturing and quality control that *can save you money . . . and increase your production.*

And there's no reason to howl when it comes time to duplicate the original wheel when you reorder, for CINCINNATI (PD) WHEELS assure you of POSITIVE DUPLICATION of the original wheel every time you reorder. "On Grade" with a CINCINNATI (PD) WHEEL means all future (PD) wheels will perform and grind exactly alike.

Yet, CINCINNATI (PD) WHEELS will cost you no more than ordinary wheels.

So, today, see your CINCINNATI GRINDING WHEELS Distributor. He'll be glad to explain how (PD) WHEELS will save you money and increase production. Or contact us direct and we'll send one of our representatives—specialists who know grinding and grinding machines as well as grinding wheels. Write, wire, or telephone Sales Manager, Cincinnati Milling Products Division, Cincinnati 9, Ohio.

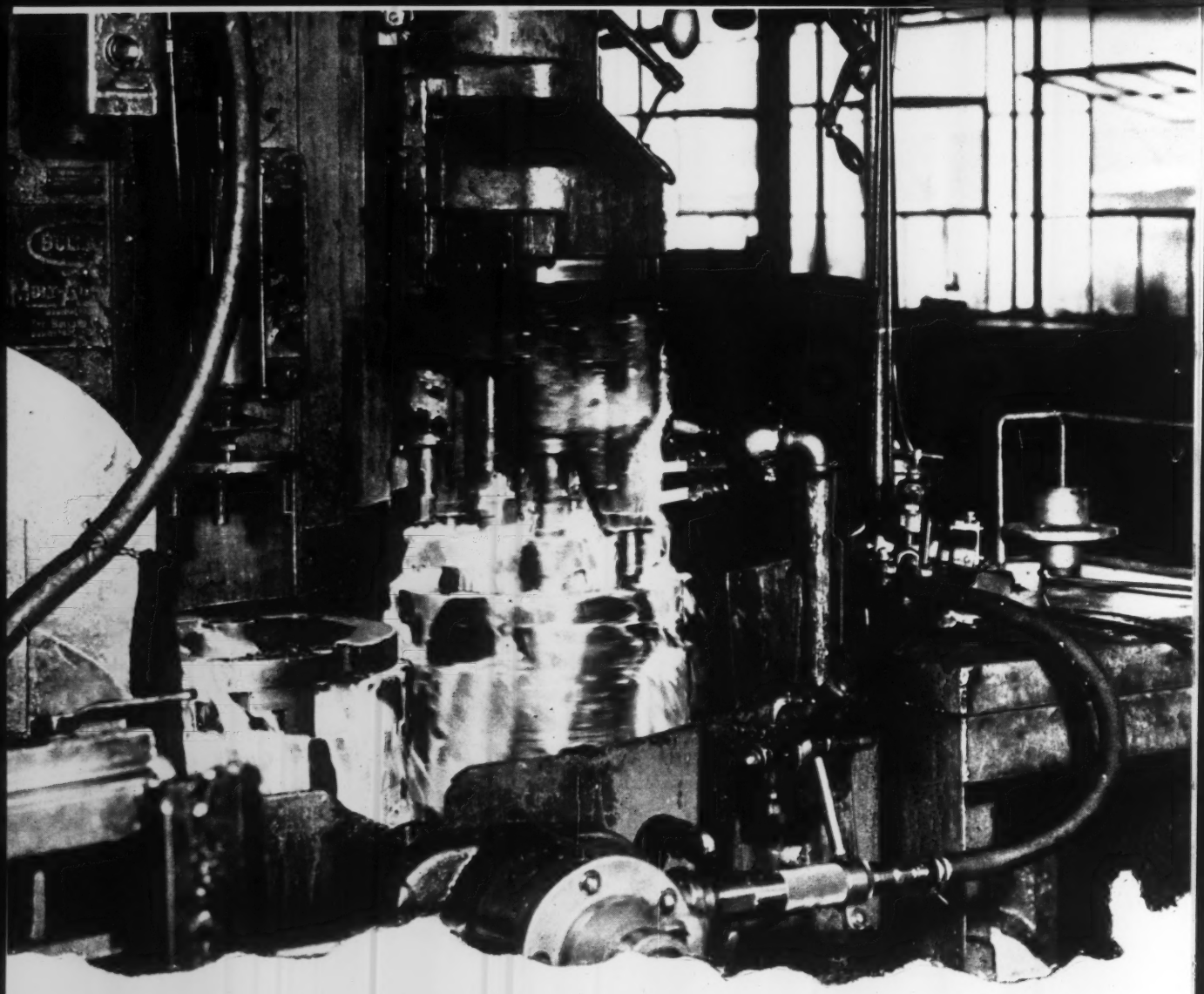
Remember—only CINCINNATI GRINDING WHEELS give you

(PD) POSITIVE DUPLICATION

CINCINNATI
Grinding Wheels

°Trade Mark Reg. U.S. Pat. Off.

A PRODUCTION-PROVED PRODUCT OF THE CINCINNATI MILLING MACHINE CO.



Don't let RUST eat away your profits

Rust in a valuable machine tool or on finished parts can sometimes cost you thousands of dollars—and it's often difficult to prevent. But it *can* be prevented. Proved in the field and constantly improved for more than 30 years, Texaco Soluble Oils have shown that they give full protection against rust.

In addition, Texaco Soluble Oils have excellent cooling and other properties—assuring longer tool life. They keep machines cleaner, emulsify readily with water, remain stable, and assure freedom from odor problems.

These are some of the reasons for machining with Texaco. And there are many others. Your local Texaco lubrication representative will be glad to give you the complete details and help you select the proper coolant from a full line of Texaco Cutting, Grinding and Soluble Oils. Just call the nearest of the more than 2,000 Texaco Distributing Plants in the 48 States, or write:

The Texas Company, 135 East 42nd Street, New York 17, N. Y.

TUNE IN... Metropolitan Opera Radio Broadcasts Every Saturday Afternoon

LUBRICATION IS A MAJOR FACTOR IN COST CONTROL

(PARTS, INVENTORY, PRODUCTION, DOWNTIME, MAINTENANCE)

Metalworking Outlook

SUB Decision Coming in Ohio

Look for Ohio's eventual acceptance of Supplemental Unemployment Benefits. A court case is underway in Youngstown to test the validity of a state official's ruling that SUB is pay and cannot be received concurrently with state benefits. The case will be carried to the Ohio Supreme Court. If that body upholds the state's ruling, the matter will be carried to the legislature or even to the people in a referendum. The steel and auto unions and industries are all trying to win SUB in the state. Odds are that the majority of Ohio's voters favor it now that we're in a business dip. They disapproved it some two years ago, but unemployment was low then.

AFL-CIO Goes Slowly in '58

The AFL-CIO is shaping a policy of caution for 1958. That's the big news that trickled out of its executive council meeting in Miami Beach, Fla., last week. It will recommend curtailing organizational drives. It will recommend (unwillingly) that its affiliated unions go slow on economic demands, although the UAW shows little sign of heeding that one. Finally, the AFL-CIO is holding off its declaration of all-out war against the Teamsters, even though archenemy James R. Hoffa is back in command.

Business Weather Cools Labor

The sluggish business climate largely accounts for the federation's wariness on the first two points. It also believes discretion would be wise until the public simmers down about scandal revelations. The scandals have severely shaken organized labor's morale. Labor leaders believe unity is all-important now and are even willing to call a truce with the Teamsters, the outfit that has caused most of the scandal.

Why a Dip? High Inventories

No major upturn in the economy for 9 to 12 months is expected by George P. Hitchings, manager of Ford Motor Co.'s Economic Analysis Dept. He believes excessive inventories are the top economic problem. He says they aren't being worked off as fast as many persons think. He adds that massive defense spending will not alone lift the recession and that postponement of normal consumer spending will deepen the slump.

Public Works: Recession Remedy?

Few economists checked by STEEL last week thought that the U. S. plan to build and modernize post office buildings and equipment will help markedly

as an antirecession remedy. The $2 billion program will be spread over three to five years.

Are We Ready for Automation?

American industry is unprepared for automation, warns Tomlinson Fort, Westinghouse Electric Corp. vice president for the Apparatus Div. A survey of 550 large industrial plants showed that not one had adequate main transformer capacity for the loads automation would demand. "If that's the situation of these major plants, what's it like in the medium and small ones?" asks Mr. Fort.

Power Possibilities

Fossil fuel production (coal, oil, gas) in the U. S. will fall short of demand within 10 to 30 years, predicts Horizons Inc., process and material research organization. Scientists are examining the possibilities of direct generation of electricity—creating current without use of moving parts. The use of solar or nuclear sources has received the most publicity, "but generating electricity in electrochemical cells is more immediately promising," says Horizons' Dr. Morris A. Steinberg. One fuel cell using a reaction of hydrogen and oxygen is in limited use. The cell is similar to a battery, except that it has porous electrodes and does not degrade. The chief drawback to the cell is cost, stemming primarily from expensive hydrogen. Another problem: The cell produces direct current, but most of America is adapted to alternating. Conversion from direct to alternating current would be expensive.

New Business in Cryogenics

Looking for new markets or businesses? Consider cryogenics, the science of refrigerants or cold gases. The use of oxygen, for example, in steelmaking, missiles, and rockets has boosted Air Products Inc.'s sales 250 per cent in two years. The Allentown, Pa., specialist in high purity gases reports last year's sales at $35 million.

Prospects Good for British Steel

Britain's steel consumers still need plenty of the metal, in marked contrast to U. S. users. One shipbuilder couldn't get enough plates at home, so it has ordered 2000 tons from America. Automakers expect to use more steel this year than in record 1957. Sheet imports will be necessary. Although Richard Thomas & Baldwins has had to close an outdated tin plate mill in South Wales, the area turned out a peak 1 million tons of the product in 1957. Structural steel demand is also good.

Straws in the Wind

Inland Steel Co. will construct a pilot plant at Indiana Harbor, Ind., to smelt iron ore by a new process . . . Sign of the weather and business times: Cleveland's Cuyahoga River, usually free of ice because of hot industrial materials disposed in it, was frozen last week for the first time since 1913 . . . A West German-Belgian group will build a steel plant for Portugal . . . ICC has authorized Class I railroads to boost selective freight rates 2 per cent. (Examples: Coal, 10 cents a ton; scrap steel, 40 cents.)

NO USE POURIN' DUTCH ANY, --- HE AIN'T INTERESTED IN COFFEE RIGHT NOW.
IF HE KNEW AS MUCH ABOUT AN OPEN HEARTH AS ANATOMY HE'D BE PRESIDENT OF THE COMPANY.
THOSE AIN'T NOTHIN', HE KEEPS THE GOOD ONES DOWNSTAIRS.
THANKS TO AN ANONYMOUS CONTRIBUTOR.
KUEKES

The Art Collector

WHY NOT DESCRIBE YOUR OPEN-HEARTH CARTOON IDEA AND SEND IT ALONG TO US?

The benefits steelmakers obtain from our refractories are in part a result of Basic's on-the-job servicing. One of the rewards of this close relationship has been the opportunity to observe and appreciate the lighter side of these usually serious craftsmen.

"Magnefer and Syndolag Set Fast—Stay Fast"

BASIC INCORPORATED 845 HANNA BUILDING • CLEVELAND 15, OHIO

How Armco 17-4 PH Stainless gives shafts longer life at low cost

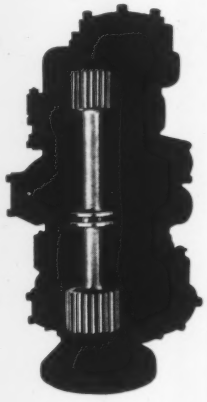
Armco 17-4 PH Stainless Steel is specified for shafts like these because it provides an unusual combination of high strength and hardness, good corrosion resistance and excellent fabricating characteristics. Where operating conditions are severe, designers have found this special Armco Stainless Steel assures economical and long, unfailing service.

High Strength Plus Corrosion Resistance

Mechanical properties of 17-4 PH show why it can be used to make shafting and other critical parts stronger, more resistant to galling and wear.

Typical Properties Armco 17-4 PH Bar (Hardened at 900 F for 1 hour)

Ultimate tensile strength, psi	180-210,000
0.2% Yield strength, psi	165-200,000
Elongation in 2", %	8-17
Hardness, Rockwell	C40-45
Endurance limit, psi (100 million cycles)	80,000



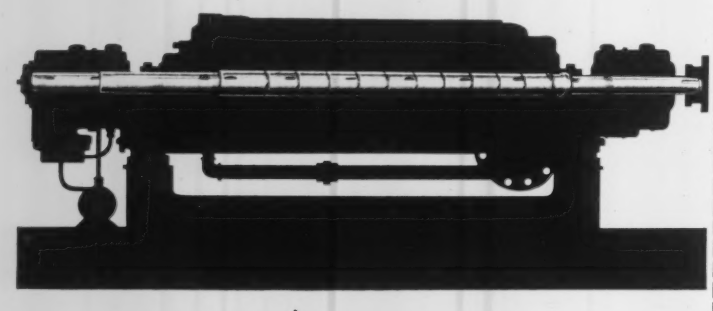
Excellent properties up to 900 F also extend the advantages of 17-4 PH to elevated-temperature applications.

In addition to high strength, this special stainless offers good corrosion resistance. It is much better than that of the hardenable chromium grades and as good as Type 302 under many conditions.

Simple, Low Cost Fabrication

Armco 17-4 PH is readily machined, forged or welded. Hardening requires only 1 hour at 900 F. This low temperature heat treatment, by eliminating scale and minimizing distortion, permits most parts to be finish-machined before hardening.

For parts of *your* products that require ultra-high strength plus corrosion resistance, consider the many design and production advantages of Armco 17-4 PH Stainless Steel. It is available in bar, wire and billets. Just fill out and mail the coupon for complete information.



ARMCO STEEL CORPORATION
1528 Curtis Street, Middletown, Ohio

Send me information on Armco 17-4 PH Stainless Steel

NAME_____

COMPANY_____

STREET_____

CITY_____ ZONE____ STATE_____

ARMCO STEEL

ARMCO STEEL CORPORATION, 1528 CURTIS STREET, MIDDLETOWN, OHIO

SHEFFIELD DIVISION • ARMCO DRAINAGE & METAL PRODUCTS, INC. • THE ARMCO INTERNATIONAL CORPORATION

What Price Free Trade?

On June 30, 1958, the Reciprocal Trade Agreements Act expires. President Eisenhower has asked Congress to extend it five years.

While the act has the commendable objective of fostering trade with friendly nations, it also presents the inherent danger of weakening industry here at home.

Our protective tariffs reached an all-time high with the passage of the Smoot-Hawley Act in 1930. Since then, they have been reduced through reciprocal trade agreements to the point where they are among the lowest of any nation.

The proposed "Trade Agreements Extension Act of 1958" authorizes the President to reduce import duties as much as 5 per cent a year over a period of five years. It also gives him authority to terminate trade agreement concessions and to raise duties as much as 50 per cent over rates existing on July 1, 1934.

The President points out that passage of the bill is needed to meet the challenge of the Soviet Union's economic drive to swing free nations into the Communist orbit. Through their advances in technology and industrialization, the Russians are now able to compete effectively on every front. The President also thinks the measure is needed to deal effectively with the common trade barriers set up by the European Economic Community (France, West Germany, Italy, the Netherlands, Belgium, and Luxembourg).

No one can deny that the administration needs a flexible trade act to maintain our world position economically and politically. However, in its dealings abroad, the administration must also safeguard industry and labor here at home.

Important segments of industry already have been hurt. An example is the sewing machine company that grew out of its small plant into a larger one before the war. It has been unable to compete with imported machines. The large plant has been abandoned; the firm has gone back to the small plant where it assembles machines from imported parts.

In about the same fix are makers of machine tools, presses, industrial trucks, automobiles, and business machines. Unable to compete in the export market, they have built plants abroad so they can make the same products at lower cost. These foreign-made products can be shipped back to compete in the home market.

Continuance of this trend could lead to the rapid erosion of America's industrial strength. It was needed to win World War II. It could mean the difference between winning or losing a third world war.

We don't think the administration will go all-out for free trade, but "liberal" thinking could let it drift too far that way. We hope you will tell the President or your representatives in Congress how your business is or may be affected.

They need to know.

Irwin H. Such
EDITOR-IN-CHIEF

"We broke the bottleneck on this part . . . purchasing called in Ryerson"

Keeping production schedules running smoothly is often as simple as eliminating a bottleneck—caused by using materials that don't fully meet your particular requirements.

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Furthermore, Ryerson service gives you complete flexibility of steel supply *without long-term commitments*. If production calls for a sudden change, you can select the kind of steel you need from unsurpassed Ryerson stocks. You get the right steel, in the quantities you want, exactly when you want it.

Ryerson's size, facilities, staff and service *attitude* assure fast delivery to meet regular schedules or to handle special short-run orders. This dependable source of certified steel is right at your finger tips. Just phone your nearby Ryerson plant—or check with your Ryerson representative — for prompt, personal service.

RYERSON CERTIFIED QUALITY

RYERSON STEEL

Member of the Steel Family

Principal Products: Carbon, alloy and stainless steel—bars, structurals, plates, sheets, tubing—aluminum, industrial plastics, metalworking machinery, etc.

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Road Program: Slow Going Until 1960s

Timetable for the Interstate System

(Contract mileage as of Jan. 1, 1958)*

1. Completed	Available for Planning	Underway	Advertised or awarded	Planned
1255	2000	2092	748	1786

This includes 920 contract miles authorized before passage of the Federal Aid Highway Act. They met interstate system specifications but were not completed until after passage of the act on June 29, 1956.

$1.5 billion is available to the states, but it's not committed to projects. STEEL estimates the money will buy about 2000 contract miles. (So far, 1 contract mile is costing about $800,000.)

*Bureau of Public Roads reports the status of the interstate system in "project" miles. STEEL uses "contract" miles to show BPR's "miles" are not the sort you drive on: They represent contracts let (1 mile of road to drive on takes about 3 project miles, says American Road Builders' Association).

2. It takes 21 months from planning to start of construction: The 1786 contract miles in the planning stage will be under construction by the last quarter of 1959. Contracts will be advertised by mid-1959 (some sooner). Construction on the 748 contract miles now advertised or awarded will start before mid-1958.

3. Construction time runs 12 to 24 months: The 1786 contract miles in the planning stage will be completed in 1960 and 1961. The 748 contract miles to be started this year will be finished in 1959 and 1960. The 2092 contract miles underway will be finished by 1959, some in 1958.

4. How fast the states plan their roads will dictate future interstate system progress: If the states, for example, continue to boost their rates of planning in the first quarter of 1958, you can expect some extra mileage to be completed in 1961 (perhaps 1800 contract miles during the year).

5. On the basis of ARBA's 3-for-1 formula (contract to actual mileage), STEEL estimates the following actual mileage will be completed on the interstate system in:

1958	250
1959	400
1960	500
1961	600

MORE HARDWARE dollars should start coming from the highway program this year, but the increase will not be startling. By 1959 and 1960, when this year's planning begins to be translated into contracts, the pace will quicken. Example: A highway planned by the states today won't be under construction until late in 1959 (see timetable).

Slow To Gain Speed — The first 18 months of the Federal Aid Highway Act have been pretty uneventful. Of the 48 states, eight are ahead of schedule (planning highways with funds apportioned by Congress for fiscal 1959); 32 states are using funds apportioned for fiscal 1958; and eight states are using fiscal 1957 funds. The average state has obligated 72 per cent of its fiscal 1958 funds.

Some states are far ahead of schedule: Ohio has obligated 97 per cent of its fiscal 1959 money, Maryland and California over 60 per cent. Some states are far behind: Delaware and West Virginia have obligated less than 50 per cent of their fiscal 1957 funds. Oregon and Texas are right at the national average.

No Longer 13-Year Program — States are doing as well as they are only because of recent speedups in their planning rates. Testimony by Federal Highway Administrator Bertram Tallamy Jr. (before the Senate Public Roads Subcommittee) indicates the administration now plans to extend the highway program to 20 years. At the present rate of construction, that still is a conservative estimate. Sen. Norris Cotton (R., N. H.), a subcommittee member, thinks 25 years is more likely; a well informed analyst in Washington favors 30 years. Commerce Secretary Sinclair Weeks has boosted the estimated cost of the program from the original $27.6 billion to $37.6 billion. Inside observers think $50 billion would be a more realistic figure.

What the stretchout means to metalworking can be seen from these figures: Marketing men now

have to figure highway steel consumption (estimated at 50 million tons) on a 20 to 30 year basis, instead of 13. That means cutting annual consumption figures by about half.

Materials Are Plentiful — This week, witnesses return to the Senate subcommittee to discuss materials. The American Road Builders' Association will predict no shortages for the next several years. L. Abbett Post, executive vice president, American Institute of Steel Construction, reports output of heavy structural shapes up 25 per cent in 1957 from 1956. He figures 1.5 million tons of fabricated steel were used last year and estimates 1.8 million tons will be used in 1960. An additional 1 million tons of structural shape capacity will be available by 1959.

Where Money Goes—From 1956 to 1957, spending for all highways gained $1.3 billion. Costs went up, too, notes Maj. Gen. Louis Prentiss, executive vice president, ARBA: Of the $4.2 billion paid to contractors during 1957 for work in place, some $400 million represented inflation since 1956.

Of the $5.9 billion spent on highways last year, General Prentiss estimates $1.3 billion was spent on right-of-way acquisition and engineering. That unprecedented spending for nonmaterial elements of the program will start to pay off in hardware this year and next. ARBA estimates all highway spending will be up 15 per cent in 1958 to about $6.8 billion.

This year as last, however, inflated land values and higher engineering costs will take their toll. Some sources foresee a doubling of the real gain, citing the expected doubling of finished Interstate System highways this year. (About 111 miles of highway were finished last year; STEEL estimates about 250 miles will be finished this year.)

How Fast Is Progress?—To complete the program in 20 years, we'll have to average 1750 finished miles of highway a year. (While the system is designated a 41,000-mile program, 35,000 miles represent new construction; 6000 miles are in toll roads and freeways completed and meeting interstate specifications.)

That 1750 miles is a long way from the 600 miles STEEL estimates will be completed in 1961, on the basis of present state planning efforts. To build 1000 miles of highway in 1962, the states would have to begin planning them about three times faster than they now are. And the planning rate increase should begin by 1958's last quarter. One official estimates the states couldn't double their planning rates within two years.

Congress Works, Too—The highway program is the biggest political football of the decade, but no one is really to blame for the lack of progress. Early estimates were much too optimistic. Some Washington analysts are now deliberately pessimistic about forecasts to avoid compounding the injury already done to the administration, highway users, and equipment and material suppliers. Some politicos, however, call for a complete revamping of the program.

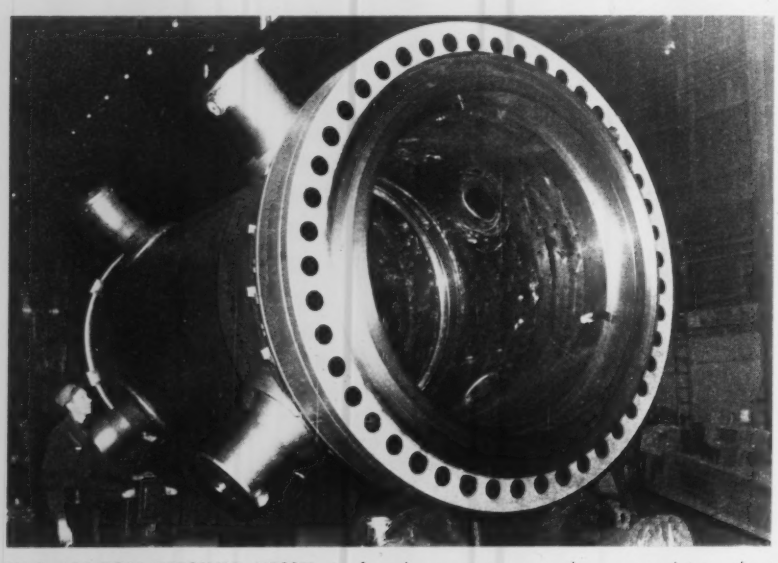
You can expect the usual noise and this legislative activity from Congress this year:

1. Reimbursement of utilities for facility relocation: Sixteen states reimburse the utilities using highway money, so the administration will present legislation to stop the drain. (Such reimbursement was not contemplated by the cost estimators, says Secretary Weeks.) Such a law has a fair chance of passage.

2. Annual diversions of about $65 million from highway money are recommended by the administration. They would be made by putting aviation gas tax receipts into the general fund and by paying for forest and public land highways out of the highway fund. The Treasury Department also wants about $4 million a year to administer the highway money. Passage of this legislation is doubtful.

3. Instead, look for a strong move toward deficit financing of the program. (By law, now, the money must be in the Highway Trust Fund before it can be apportioned to the states.) Passage of such legislation is doubtful this year because missiles are already forcing us into a deficit. But with returned economic health in 1959, there's a possibility the trust fund could be dumped, and highways would be paid for out of general revenues. Protagonists of the idea claim the program could be speeded up that way.

Big Trouble — Ultimately, most of the trouble with highways goes back to the property owner who puts up a fuss when he learns the new highway will go here instead of there. Through court action, a single mile of highway can hold up 100 miles for years. How do you solve that problem?



THIS 100-TON PRESSURE VESSEL is for the prototype nuclear propulsion plant of the nation's first atomic powered surface ship. (Here it's shown before shipment to the Naval Reactor Facility at Arco, Idaho.) The vessel flange has an outside diameter of 137 in. Its shell is 105 in. in diameter while the reactor vessel measures more than 19 ft long. The unit is built by Westinghouse Electric Corp., which has a contract with the AEC to design and develop the nuclear propulsion plant for the ship

Ups Silicon Output

Major producer of this metal builds Ohio facility to serve aluminum, chemical, steel firms

THE FIRST of three submerged arc furnaces has been installed at Ohio Ferro-Alloys Corp.'s new reduction plant near Powhatan Point, Ohio. The plant will produce silicon metal for the aluminum and chemical industries and ferrosilicon for the iron and steel industry.

Ground was broken last April for the $3 million plant; building started in September. When completed, it will be the third largest of the company's four plants. Others are at Philo and Brilliant, Ohio, and Tacoma, Wash. Home offices are in Canton, Ohio.

The firm has spent $11 million in expansion and modernization in the last eight years, quadrupling its product line. It now makes 40 different items, including alloys of magnesium, chromium, and silicon.

Here's Why — One reason for plant expansion: Anticipated growth in aluminum diecastings. The company figures use of aluminum in automobiles by 1965 will be boosted to 6 million lb annually, double the 1957 figure. The firm expects a great part of this to contain 3 to 12 per cent silicon.

The major producer of silicon metal also looks for continued sharp gains in the use of silicones in consumer products, such as polishes, water repellents, and hand lotions.

Electric energy for the Powhatan plant will come from Ohio Power Co.'s new Kammer generating station at Cresap, W. Va., about 4 miles away. Furnaces will be automatically operated by a new regulator on which Ohio Ferro-Alloys holds the patent.

The plant is served by the Pennsylvania Railroad. A barge dock will be built so that products can be shipped by water to Pittsburgh, Chicago, and the South. Thomas Casto transferred from the Tacoma plant to manage the new facility.

New Firebrick Plant Opens

Valentine Div., A. P. Green Fire Brick Co., opened its new $1.5 million plant at Woodbridge, N. J., to produce semisilica firebrick. The new facility covers 18 acres and replaces a plant destroyed by fire in October, 1956.

Silver Producer Expands

American Platinum & Silver Div., Engelhard Industries Inc., has doubled the size of its Providence, R. I., plant and warehouse. New facilities include a vault three times as large as the former one.

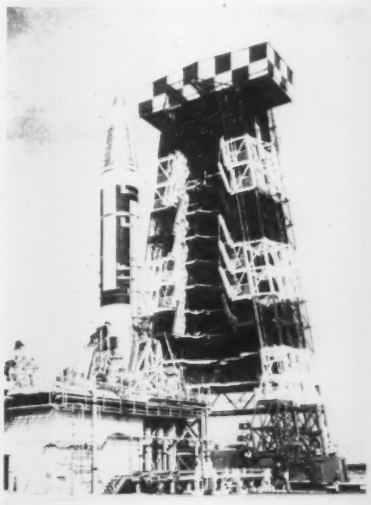
AP&S also purchased 8400 sq ft of adjacent property for future expansion.

Builds Pilot Plant in Ohio

U. S. Industrial Chemicals Co., a division of National Distillers & Chemical Corp., is building a pilot plant in Cincinnati to produce tantalum and columbium. It's expected to be on stream by April.

Capacity will be 1 ton per month on a one-shift operation. The two metals will be produced in approximately equal quantities by a U.S.I.-developed sodium reduction process.

Chemical processing will be the primary market for tantalum. Columbium, an alloying material for steel, shows considerable promise for nuclear applications, including gas-cooled reactors. It may also be used in supersonic aircraft and gas turbines.



THE ATLAS intercontinental ballistic missile stands clear on its launching pad. The gantry tower used in readying the missile for flight is being rolled away from the launch stand at the Air Force Missile Test Center, Cape Canaveral, Fla. Convair Div. of General Dynamics Corp. is testing the ICBM for the Air Force. The missile is in pilot production at the San Diego, Calif., plant of Convair-Astronautics

Westerner Ups Capacity

Sierra Drawn Steel Corp. has added $60,000 worth of steel processing equipment at its Los Angeles plant to up capacity 50 per cent. The firm produces cold-finished steel bars up to 7 in. in diameter.

New machinery includes a $33,000 straightener built by Lewis Machine Co., Cleveland, and a 5-ton draw block costing more than $25,000.

Other recent Sierra improvements include plant additions of 6000 sq ft at Los Angeles and 4000 sq ft at Seattle.

GM Adds To Engine Plant

A 289,000 sq ft addition to General Motors Corp.'s Detroit Diesel Engine Div. plant is under construction. Completion is scheduled for May. It will house all final assembly, testing, and shipping facilities for the division.

Two new assembly lines will be added to the three present systems. Layout revisions will not interrupt production. The addition will bring the division's floor space to over 1.5 million sq ft.

Cablemaker Ups Capacity

Times Wire & Cable Co. Inc., Wallingford, Conn., an International Silver Co. affiliate, is building a 25,000 sq ft plant addition. Costing $300,000, the expansion will increase capacity by more than 35 per cent.

The firm produces television coaxial cables and special cable for missiles and electronic brains.

California Firm Expands

Interstate Precision Products Corp., Anaheim, Calif., has completed a 36,470 sq ft plant addition. Sixteen offices take up 20 per cent of the space; the remainder will be used for manufacturing. Cost: $280,000.

Building good annual reports is one phase of a program to . . .

Gain and Keep Stockholders

WOOING stockholders, like putting your best foot forward for the boss, is just good business.

Operating at a profit and paying a dividend aren't enough. The job requires a continuing program of getting your story told to: 1. The general public (your source of stockholders). 2. The professionals who deal with your current and prospective stockholders.

To improve your public and stockholder relations: 1. Develop good relations with the press. 2. Get your story told to investment bankers, brokers, and others in the financial world. 3. Improve your annual report. The points were emphasized at a clinic on stockholder and public relations sponsored by the Midwest Stock Exchange, Chicago.

The basic responsibilities for good press relations rest with top management, stressed Edward C. Logelin, vice president of U. S. Steel Corp. When company policy or operations are concerned, the press prefers to talk to the chief executive. But any management representative will be acceptable if he is informed, has authority to answer questions, and is willing to answer them frankly.

Through the Press—In your everyday contacts with the press, Mr. Logelin recommends: Keep press material factual and dependable. Pay attention to the mechanics of news coverage by hiring a specialist and/or retaining the services of an outside agency. Make sure a company representative is available to answer questions and clarify statements when they are made.

Two good ways of alienating local editors, cautioned the steel executive, are: 1. Asking the advertising department to intervene. 2. Handling your public relations through an out-of-town agency. Another is taking every story through the publisher—financial editors are human, too, and often will resent your going over their heads.

Through Advertising — Selling your company through institutional advertising makes stockholders and others in the business and financial world aware of your firm and its progress.

"In a survey of 152 investment bankers," related J. R. Pershall, Chicago advertising executive, "91 per cent reported that corporate advertising favorably affected the sale or stability of a company's securities." Another plus factor, he pointed out, is that this type advertising reaches the financial world, often makes it easier for a firm to secure loans.

"Awareness" advertising has side benefits, too. It often helps attract better employees; it influences the attitude of suppliers, dealers, and contractors toward you; and it can help build confidence in your product.

Through Reports — Your annual report will be more effective if you tailor it to appeal to the small untrained investor, your employees, general public readers, and professional investors.

The report should contain this information, recommends Weston Smith, of Weston Smith Associates, New York:

1. Comparative balance sheets and income accounts with dividends and earnings presented on a per share basis.

2. An interpretive president's letter written in "newspaper English." It should cover important changes of the past year and comments on the outlook for the company and the industry.

3. An informative narrative section explaining developments summarized in the president's message.

4. Supportive tabulations, charts, and pictures.

5. Modern design, attractive typography, and good printing.

To balance the report, Mr. Smith suggests that the front part be prepared for the small investor and untrained financial reader. The back part should be organized for the banker, broker, and professional investor, who require statistics, breakdowns, and ratios such as profit margins, net worth, and working capital.

Big Benefits—"You're vulnerable to a raider-type proxy fight if your company is worth more than its stock is selling for," says Brainerd Chapman of Lord, Bissell & Brook, Chicago. "If it sells for what it's worth, the raider's desire to get something for nothing is eliminated. Good stockholder relations will help maintain a fair price on your stock. It will also help you win stockholder support if you get caught in a proxy fight."

Boosts Power Supply

Kennecott Copper Corp. will boost the generating capacity of its Utah Copper Div.'s central power station in Magna, Utah, from 100,000 to 175,000 kw. Cost: About $16 million. Designer: Kuljian Corp., Philadelphia.

The division's annual capacity is about 500 million lb. It provides about 8 per cent of the world's primary production.

Enlarges Main Plant

Roots-Connersville Blower Div., Dresser Industries Inc., has added 40,000 sq ft to its main plant. The new area will be used to make blowers, gas pumps, and gas meters.

Transport Outlook

It depends on rise in economy, plus favorable legislation likely by mid-'58

A REVERSAL of the decline that hit transport activities in 1957's fourth quarter is foreseen by the U. S. Chamber of Commerce. An upswing in the general economy, particularly heavy industry, and rate and fare revisions could do the trick. A new tax structure that would be helpful is also a probability.

Up Slightly—Over-all, transportation gained a little last year: Total intercity ton-miles are estimated at 1363 billion, against 1360 billion in 1956, but interindustry variations were big. For example: Air freight, 407 million ton-miles, was up 23 per cent; railroads, at 630 billion ton-miles, showed a 4 per cent reduction; inland water shipping, with 123 billion ton-miles, was up 12 per cent; passenger ton-miles, totaling 716 billion, rose 3 per cent—the increase was largely credited to private travel, although airlines reported a 14 per cent increase in domestic service and railroads a 6 per cent drop; pipelines, with 230 billion ton-miles, remained unchanged.

Rising operating costs and the fourth quarter decline offset gross revenue increases with a resultant dip in net income. Here are special transport problems:

Air Transportation—In deals involving foreign flags, more equitable treatment for U. S. carriers is being sought in U. S. grants.

Railroads—A Senate subcommittee is investigating the economic problems of railroads and their impact on national transportation. Hearings are anticipated on a new federal agency which would purchase and lease much needed rolling stock to railroads.

Highways — This issue is up again: Should the states be reimbursed for existing toll and free roads taken into the interstate system?

Taxes—Revisions could make the carriers' load lighter this year.

Postal Rates—An increase, which could change some of our present shipping methods, is almost positive in 1958.

Trends in Mergers*

Industry Group of Acquiring Concern	1955	1956	1957
Mining	34	35	31
Food & kindred products	54	53	32
Tobacco manufacturers	2	3	4
Textiles	30	34	23
Apparel	2	—	3
Lumber & furniture	5	11	5
Paper & allied products	18	21	30
Printing & publishing	4	8	4
Chemicals	42	53	35
Petroleums & coal products	7	13	4
Rubber products	4	5	6
Leather products	3	5	1
Stone, clay & glass products	18	13	22
Primary metals	40	23	31
Fabricated metals	45	27	46
Machinery, except electrical	79	79	57
Electrical machinery	45	39	40
Transportation equipment	39	46	25
Professional & scientific instruments	12	14	16
Miscellaneous	16	12	23
Nonmanufacturing	26	43	52
Totals	525	537	490

*These are not total mergers, just those reported by Moody's Investors Service and Standard & Poor's Corp.

Merger Pace Holds

MERGERS are continuing at about their usual rate despite the government efforts to discourage them. Acquisitions reported under negotiation came to 941 in 1957, vs. 905 in 1956.

The figures do not represent total mergers consummated last year, merely the trend. Acquisitions recorded are limited to those reported in *Moody's Industrials*, *Standard Corporation Records*, the business and daily press.

Trends—Significant changes in the trend (1957 vs. 1956): Mergers among manufacturing and mining businesses were down (598 vs. 638), as they were in retail and wholesale businesses (114 vs. 148); they were up in service and other businesses (58 vs. 51). Partial acquisitions hit 171, vs. 68 in 1956.

Former labor leader Harold J. Ruttenberg says . . .

Union Methods Are Outdated

THE COLLECTIVE bargaining program of labor unions in basic industry was obsolete in the 1940s and is untenable today, asserts a former leader of the United Steelworkers of America, Harold J. Ruttenberg (now president of Stardrill-Keystone Co., Beaver Falls, Pa., a producer of well drilling equipment).

He says that automation has proved inadequate as a management counteroffensive. The solution: A new collective bargaining program to be formulated by management.

Outlived Use—Management failings caused unions to originate collective bargaining. Its purposes were to increase workers' purchasing power, spread work by reducing hours, eliminate wage inequities, modernize working conditions, stop indiscriminate hiring and firing, and halt other management abuses.

Unions have clung to that basic approach for two decades. But it has little to offer the worker in this era of high employment and record earnings, contends Mr. Ruttenberg. So big unions (he cites the United Auto Workers and USW) chromeplate their approach with fringe benefit demands and unrealistic proposals of more pay for less work.

Cheat Nonmembers—Automatic cost-of-living wage hikes insulate union members against higher living costs. Then, through collective bargaining, they obtain greater purchasing power. Management, in turn, must raise prices to assure stockholders a fair return on investment. The result: Lower purchasing power for all but union members.

Says Mr. Ruttenberg: "Each time wage increases not justified by productivity are followed by price increases, unions are robbing and plundering persons with fixed incomes."

Since unions will not initiate a collective bargaining program based solely on productivity, Mr. Ruttenberg says management must do so. He says the time in the auto industry is 1958; in steel, 1959. Here's the plan he wants industry leaders to sell to their employees:

Preamble — Tell them that the firm can't raise productivity through automation alone fast enough to counteract union demands. So it must raise prices. Show them how they're insulated against price increases by their cost-of-living wage adjustments. Show them how that condition places both union and management in a position which cannot be held or defended because it cheats nonunion persons and slows down the country's productive power while Russia is intensifying hers.

Proposal—Offer: 1. To pay higher wages for more production. 2. To purchase equipment that produces more. 3. To initiate methods that produce more. 4. To provide a way for each employee to work at his full capacity. 5. To train employees. 6. To negotiate a practical measurement of productivity.

The productivity formula would include these factors: 1. Employees' performance (physical and mental). 2. Stockholders' investment. 3. Management's methods, skills, and practices. 4. Employees' co-operation. 5. Effect of volume of production or percentage of capacity operations. 6. Product mix. 7. Effect of new or improved materials. 8. Effect of a change in the amount of purchased goods and services.

Employees would receive a semiannual wage increase in direct proportion to their contribution toward higher productivity. Half the wage hike would be in direct pay, the other half in fringes.

Arguments—Mr. Ruttenberg offers these arguments for his proposal: 1. Labor cannot claim the full benefit

of improved productivity. All the other factors in the formula are contributory. Each must be given its due return. 2. This program would stop the "pegging" of production. 3. Any person can earn more money by producing more goods. 4. Persons not insulated against inflation by automatic wage increases would no longer suffer.

Conclusion — Says Mr. Ruttenberg: Union leaders can contribute much to the effectiveness of management. They have been doing so indirectly and negatively. It's time for a direct and positive program of co-operation to increase productivity.

R. CONRAD COOPER

WALTER F. MUNFORD

U. S. Steel Shifts Top Men

R. CONRAD COOPER has been appointed executive vice president, personnel services, for U. S. Steel Corp. Walter F. Munford, who was assistant executive vice president, operations, is now executive vice president, engineering and research.

Mr. Cooper, who had been vice president, administrative planning, replaces John A. Stephens and assumes the job of top labor negotiator for the corporation. A major job will come in 1959 when the United Steelworkers contract expires.

Requested Change—Mr. Stephens assumed the position of vice president, industrial relations, in 1943. He has weathered many labor-management storms and at one time was suggested as top labor negotiator for the entire steel industry. Mr. Stephens asked to be relieved of administrative duties but will remain with U. S. Steel as an advisory vice president.

Mr. Cooper's experience dates back to 1926 when he worked as a field engineer. He joined U. S. Steel in 1945 as assistant vice president, industrial relations. He was appointed vice president, industrial engineering, in 1948 and was appointed vice president, administrative planning, in October, 1955.

Other industrial relations moves include appointing George M. Thursby administrative vice president, employee relations (was vice president, industrial relations, administration) and naming R. Heath Larry administrative vice president, labor relations (was assistant general solicitor for labor matters).

Munford Experienced—Mr. Munford assumes his new position with 35 years' experience in the steel industry. During those years he worked in Worcester, Mass., Cleveland, and Pittsburgh. He was president of the American Steel & Wire Div. from 1953 to 1956 when he became executive vice president, operations, for the corporation.

Two other managerial changes have been announced by U. S. Steel's president, Clifford F. Hood. M. W. Reed, formerly executive vice president, engineering and raw materials, is now executive vice president, international and raw materials. The change involves the consolidation of corporation foreign interests into a new international and raw materials department.

H. B. Jordan, who has been executive vice president, operations, becomes executive vice president, production, more properly signifying the broadened executive function relating to steel production, fabrication, and manufacture.

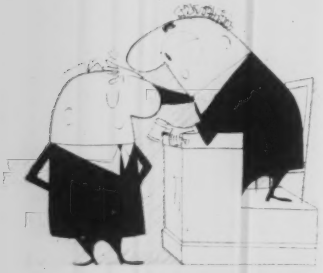
George W. Rooney continues as executive vice president, accounting, and R. F. Sentner continues as executive vice president, commercial.

Will Build Addition

Superior Fireproof Door & Sash Co. Inc., Scranton, Pa., is planning a 20,000 sq ft addition to its plant. New machinery will be purchased. Estimated total cost: $80,000.

Joy Division Builds

Joy Mfg. Co.'s Turbo-Dynamics Div. will build a 30,000 sq ft plant near Buffalo on a site acquired one year ago. Costing $400,000, the plant will house research and testing laboratories for work in turbodynamics and aerodynamics. The division may go into the development of components for missiles.



Tool Industry Gets O.K. from Justice

THE MACHINE TOOL industry got a clean bill of health from the Justice Department. Last week, Attorney General William Rogers sent a report to Congress (required under the Defense Production Act) showing how government assistance since World War II affected builders' competitive positions.

In most cases of federal encouragement, Justice concluded that the industry's competitive balance had been little changed. Fast tax writeoffs, for example, were granted in proportion to a company's share of the market.

But Justice Wants More Information

Most significant part of the report: Justice's account of its efforts to obtain sales information.

Justice recommends that legislation be passed to give it access to Business & Defense Service Administration's industry reports. BDSA now keeps such information in confidence, claiming it couldn't get it otherwise. Justice surveyed the industry but only the smaller firms replied.

GE's Johnson Lands Space Job

Roy W. Johnson, vice president, General Electric Co., will head the Advanced Research Projects Agency, new arm of the Pentagon designed to direct research and development on military applications of our space projects, including antimissile missiles, new satellites, and other space vehicles.

Until Congress decides otherwise, ARPA will also continue present nonmilitary projects, including upper atmosphere and space studies. Defense Secretary Neil McElroy expresses the hope that the nonmilitary side of space will eventually be turned over to the National Advisory Committee for Aeronautics.

He Will Control R&D Contracts

Unlike the postsputnik appointment of Dr. James Killian, and the change in title of missile boss William Holaday, Mr. Johnson will be charged with the responsibility of letting contracts in space research. The transfer of Army, Navy, and Air Force facilities and personnel to ARPA is also foreseen by a high Defense Department spokesman.

Mr. Johnson will have over $50 million at his disposal when he takes over Apr. 1. (That money was previously appropriated to the individual services.) Over $300 million will be available for contracts in fiscal 1959.

The remaining role of each branch of the service in the space drama is pretty well indicated by Mr. McElroy's plan to farm out manned space flight with the X-15 to the Air Force. Expect similar action on other space projects to keep the services happy.

Thor or Jupiter Won't Last Out Year

Pentagon sources, plus well informed scientists in Washington, are writing off the Thor and the Jupiter. They conclude one, perhaps both, will be abandoned this year, depending upon the success of the Navy's solid-fueled Polaris.

A land-based Polaris is under development, and high Defense officials are fairly well convinced we do not need to attempt mass production of liquid-fueled missiles. Time required to fuel them and their proneness to misfire dictate that we do not place our hopes for survival on them, these sources conclude.

After a successful sea-type Polaris firing this year, you can expect this decision to be made public. The Army is racing to get its 500-mile Pershing (solid-fueled) into the air. It replaces the Redstone.

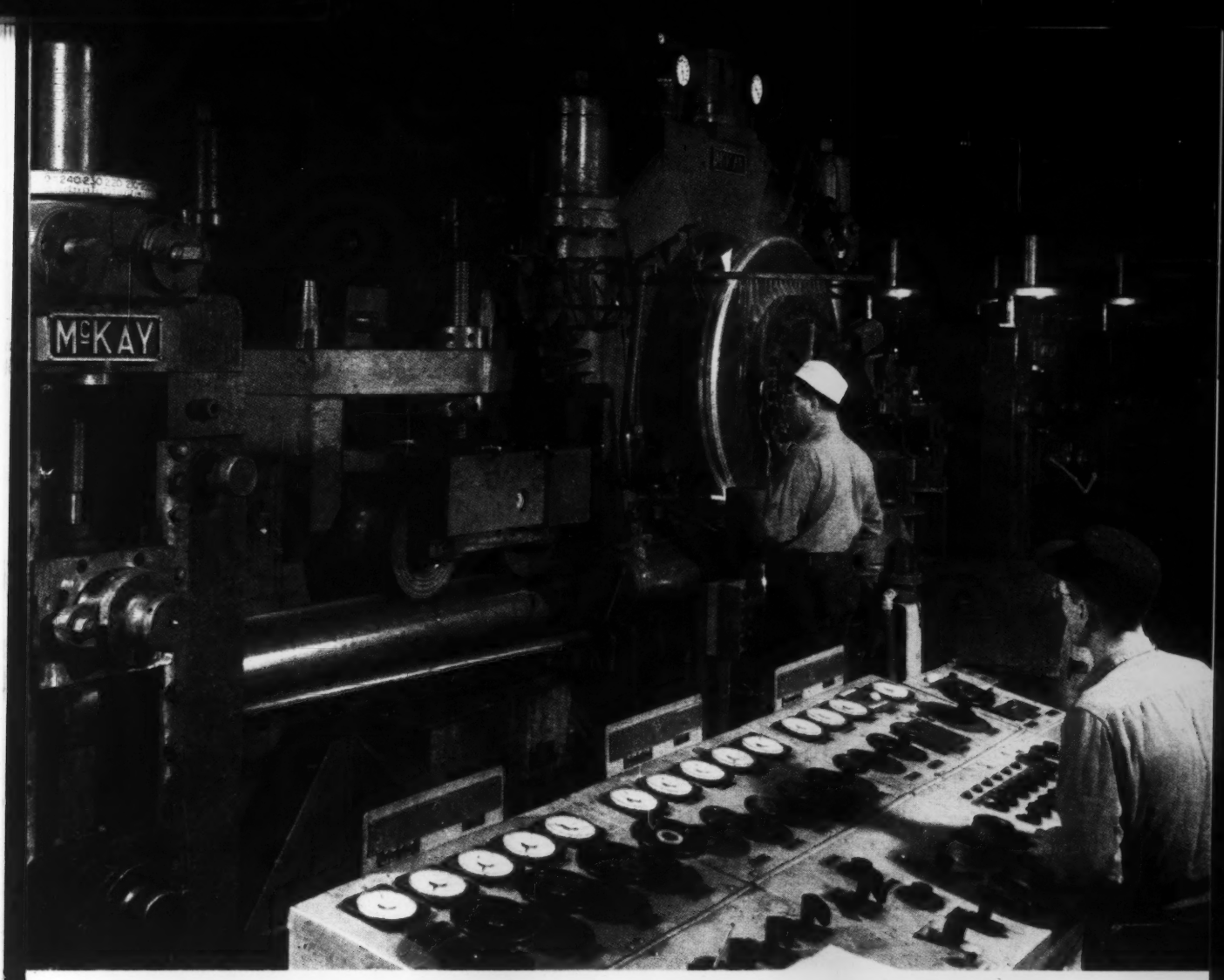
Small Business Investigations Set

Sen. John Sparkman's (D., Ala.) Small Business Committee will look into these major areas this year: 1. Operations of the Small Business Administration (SBA expires June 30; chances are it will become a permanent agency). 2. Why businesses fail. 3. How foreign aid programs affect small firms. 4. Tax relief for small business. 5. How mergers affect small companies. 6. Concentration in the electrical appliance industry. 7. Missiles and small firms. 8. Exports of small companies. 9. Who uses government-owned production equipment. 10. Financing problems.

Chances for New Highway Mileage

Hopes to add 7000 miles to our 41,000-mile interstate system will probably not materialize this year because of the program's lack of progress (see Page 73). However, a move is developing behind Rep. Charles Buckley's (D., N. Y.) bill to add mileage equivalent to that of state toll roads which meet interstate system standards. That could amount to over 2000 miles, with New York and Pennsylvania the biggest gainers.

Whatever the trouble with our highway program, don't be alarmed by any Congressional move to forestall additional mileage, say insiders. It's only a matter of time: If the additional miles don't show this year or next, they'll be provided for long before the program runs out of miles to build. The informants conclude the federal program is with us forever.



Advanced Design McKay Mill Sets Pipe Production Records At J&L

New era in pipe production comes of age as McKay incorporates oil cooled transformer, continuous visual recording of weld pressure and induction seam annealing, automatic control of weld speed and heat and synchronization of cut-off in large resistance weld pipe mill.

RECENTLY Jones & Laughlin Steel Corporation set into operation their new McKay Pipe Mill capable of producing 150 feet of 12¾" OD electricweld pipe every minute. More important than the speed, according to J & L officials, is the quality of the product. McKay's forced oil cooled transformer assures more pipe per kilowatt hour. It is the first 2400V transformer designed for continuous operation at frequencies up to 180 cycles.

Hydraulic load cells measure forging and electrode pressures at the weld zone. Weld speed and heat are controlled with precision to assure the most uniform welds possible at any speed with no readjustment necessary. Continuous seam annealing assures uniform ductility of pipe, and for the first time a synchronized cut-off has been successfully adapted to a large mill. The mill has several other advanced innovations applied to a line this size for the first time. To get all the facts talk with a McKay engineer soon.

McK

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Efficient Eaton-Reliance Thread-Cutting Springtites and Sems not only cut their own threads without tapping, but, in so doing cut production costs. Because they are preassembled with either helical or tooth type washers, they can be used with fewer motions as well as fewer lost parts. With the elimination of tapping many man hours are saved.

Production men have found these "fast" fasteners seat firmly without thread stripping or mismating. They are easy to use, easy to store and because of their high quality, add value to your products. Eaton-Reliance Thread-Cutting Springtites and Sems are available in all types: round—fillister—pan—truss—hex, slotted, Phillips and clutch. For more detailed information write for Engineering Bulletin S-49A. It's yours for the asking and just might save you a lot of money.

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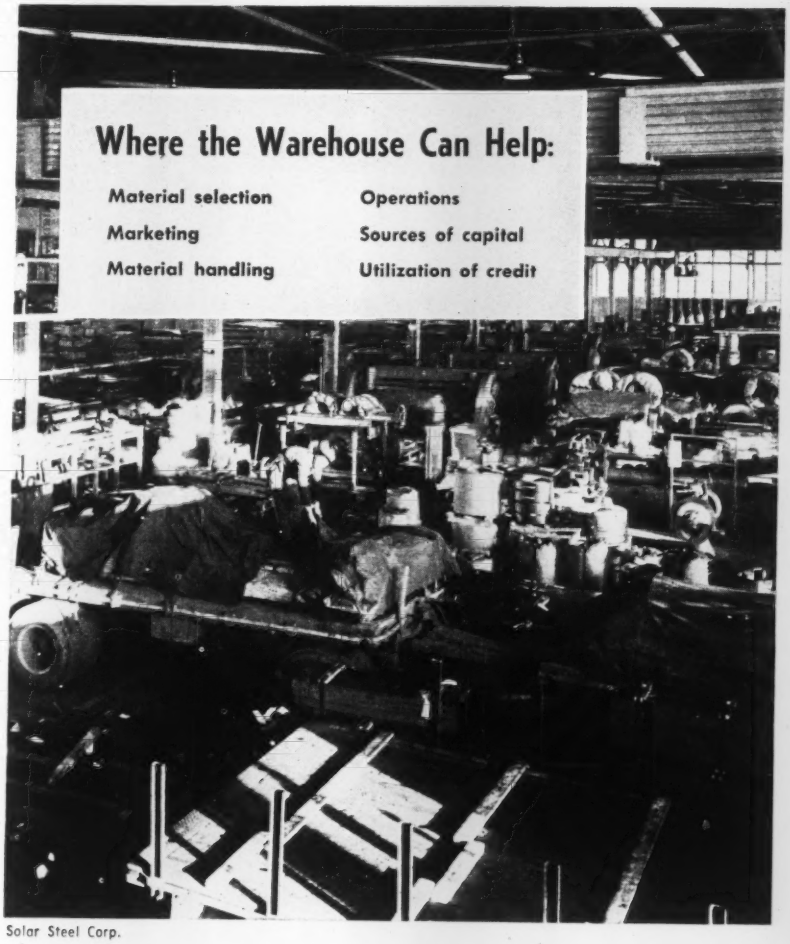

Solar Steel Corp.

Evolution in Warehouses

Solar Steel's Friedman sees modern warehouseman playing bigger role as consultant to his customers. Areas include material handling, product improvement, financing

STEEL warehouses are becoming increasingly active as management consultants to customers.

Daniel A. Friedman, president of Solar Steel Corp., Cleveland, believes it is a natural step in the evolution of the warehouse function. Says Mr. Friedman: "Warehouses started out as nothing more than department stores where the customer could pick up needed materials. Then they began fabricating materials to customer specifications. Now warehouses are graduating into the area of management consulting.

"There's nothing new about the warehouse giving a customer advice on his problems. What is new is the recognition by warehousemen that they should set up formal consulting programs to help customers in: 1. Material handling. 2. Product improvement. 3. Financing."

Solar started such a program last year. "Our policy is to let customers know we are ready to help them at any time. We don't give advice until we are asked. Then we go into the customer's plant and make recommendations," says Mr. Friedman.

Case History No. 1—An eastern firm in the lighting fixture field recently found itself in a dilemma: Its sales could be 20 per cent greater if facilities were expanded. But the company was unwilling to acquire more manufacturing space because it wasn't certain the added business would hold up.

At the customer's request, Solar investigated and found the manufacturer maintained a large stock of raw material, plus two shears to process it. Solar reasoned if the firm would reduce its storage space and get rid of one of the shears, it would have its added production space at no extra cost. Recommendations: 1. Sell one of the shears. 2. Buy processed materials to size. 3. Reduce the amount of raw material on hand. 4. Add an unloading crane to speed up distribution of incoming stocks.

The company followed the suggestions. Results: 1. Production was increased 20 per cent. 2. Raw material cost was lowered 10 per cent. 3. Sale of the shear more than covered all costs; $3000 in cash was left over.

"The warehouse is in an ideal position to advise customers on such material handling problems as this," Mr. Friedman says. "Here's why: The warehouse is continually finding ways to lower its own expenses in this area. Material handling work it does daily may be faced only occasionally by the customer."

Case History No. 2—A midwestern maker of screw machine products was using a 15 cent a pound cold finished bar for his product. Each pound yielded 15 units—a cost of 1 cent per unit.

In addition, the manufacturer spent 5 cents per unit for inside boring and treating and 1 cent per unit for outside treating. Total unit cost: 7 cents.

Solar convinced the customer that money could be saved by using hollow bars, even though they cost 30 cents a pound. They yielded 25 units per lb, which put the material cost at 1.2 cents per unit. But the expense of inside and outside

treatment were each lowered to 1 cent per unit. New unit cost: 3.2 cents, a saving of more than 50 per cent.

"This area of production improvement offers the warehouse a real chance to be of service to the customer," Mr. Friedman says. "The warehouseman can show the customer how to avoid wastage, recommend the right material for the right job, and give advice on raw material inventories."

Case History No. 3—A Chicago manufacturer came to Solar with this problem: His credit was stretched to the limit, yet he could get more business if he had additional capital.

Investigation turned up one important fact. At its rate of expansion, the company would grow out of its plant in five years.

Solar recommended: Sell the building, then lease it for five years. The money received would take care of all working capital requirements. At the same time, money could be set aside to purchase or lease new facilities at the end of five years.

"It's vital that warehouse people be ready to help with a customer's financial problems," Mr. Friedman believes. Solar maintains a credit manager in each company warehouse. His main function is to help small business. "Our credit people are generally able to suggest ways a manufacturer can increase his capital by:

"1. Determining how much his creditors will give him to operate.

"2. Finding how he can utilize assets in debts of long duration.

"3. Suggesting where he might increase capital through sharing of ownership (such as merger and sale of stock)."

Sums up Mr. Friedman: "Warehouses build profits by helping customers increase their sales and profits. Programs to advise customers will soon become the rule in the warehouse industry."

Illinois Firm Adds

Rust-Oleum Corp., Evanston, Ill., has completed a two year, $600,000 expansion program. New additions include a 12,000 sq ft warehouse, bar mill equipment, an automatic packaging system, offices, and a cafeteria. The firm makes rust prevention products.

Fairchild Engine & Aircraft Corp.

Recession Hits Cutting Tools

Producers look for gradual improvement as big customers come back into the market. At best, they're likely to match last year's sales. Ceramics gain favor

CHILLED to the marrow by January sales reports (down 30 per cent from those of a year ago), cutting tool manufacturers expect to thaw out gradually.

The sooner a few open hearths are reactivated, the faster they'll thaw—since demand for their products is closely related to the melting schedule for steel.

Softness in the automotive industry is troubling the toolmakers, as is reduced demand from other big customers: Manufacturers of home appliances, machine tools, aircraft, construction equipment, and farm machinery. Wesson Co., Detroit, expects its automotive sales to show a slight improvement during the second quarter and a 15 per cent gain during the third. "We'll go out of the fourth quarter booming," predicts Ray W. Ruckel, president.

Wait and See—Well aware that

their customers intend to buy new equipment, toolmakers are puzzled by unexpected delays in receiving orders. Buyers need assurance that all's well with the economy, they conclude. Philosophical in his acceptance of the situation, E. A. Goddard, president of Goddard & Goddard Co., Detroit, says: "I always figure that since we're making perishable goods we don't have too much to worry about. We're bound to get some orders eventually."

Last year, the industry sold more than $400 million worth of tools for boring, drilling, reaming, tapping, hobbing, shaping, planing, broaching, and other operations. The Bureau of the Census estimates 1954 shipments at $291 million and 1947 shipments at $205 million. There are about 424 companies that specialize in production of "small cutting tools for machine tools and the metalworking industry," says the bureau.

As might be expected, toolmakers have short backlogs (ten days to seven weeks, say the companies interviewed by STEEL). They're still working 40 hours, but with fewer employees. In some instances, the productive work force has been cut 30 per cent.

Stable Prices—Cutting tool prices probably won't change much in '58. General Electric Co.'s Metallurgical Products Dept., Detroit, has reduced prices of its cemented oxide (ceramic) tools by 40 per cent. Higher steel prices, expected at midyear, will force some producers who are already complaining about a profit squeeze to raise their quotations.

Where there's an oversupply of small tool shops, price increases will be most unlikely. Even now, big producers report that small competitors are nipping at their heels. Not only do the little firms bid lower, but they also promise faster delivery. Says a big midwestern toolmaker: "We're losing more business on the basis of delivery time than we are on prices."

Shift to Missiles—Speculating on the importance of the Air Force shift from manned aircraft to missiles, a spokesman for Greenfield Tap & Die Corp., Greenfield, Mass., says: "Riveting will be all but eliminated, and that won't help our twist drill sales. Nor will the rocket motors require as many machined moving parts as piston or jet engines. However, the superalloys used in missile building are so tough that they'll wear out taps and drills much faster than conventional metals would, so it's hard to tell what the net result will be. The immediate outlook is none too good because a $100-million missile program means about $80 million spent in the laboratory."

Long valued for their high strength, low cost, and versatility, high speed steels are still the biggest sellers in the cutting tool field. Although they have lost out to carbides in single point applications, they are still ahead where large interrupted cuts are required. "With proper feed, they can be used to cut the high temperature alloys," says J. H. Devlin, sales manager, Weldon Tool Co., Cleveland.

Carbides Gain—Although they're more expensive than high speed steel, carbide tools continue to chalk up impressive sales gains. Wesson Co. expects to introduce a cemented carbide that will permit economical machining of steel at speeds from 800 to 2000 sfpm. It's thought that this may slow the rush to ceramics.

Greenfield, long a producer of high speed steel tools, will enter the carbide field with a line of reamers, drills, and end mills.

Much of the carbides' recent growth can be attributed to the popularity of throwaway tips, which require no grinding and permit fast tool changes. Soon to be announced is the development of throwaway insert broaches for machining jet aircraft stators.

Cast Tools Fade — "We've felt quite a squeeze in Detroit because of the advent of the carbides," says a producer of cast cutting tools. "They're about as far ahead of us in machining speed as we're ahead of the high speed steels. However, our tools resist shock better than carbides. Our strength is in form tools and plunge cutting."

Ceramics Improve — Although they still have an insignificant share of the cutting tool market (probably less than 1 per cent), ceramics are making rapid strides. Says Edward Kibbitt, manager of Carborundum Co.'s Stupalox Dept., Latrobe, Pa.: "We're offering much better materials this year. Our oxide tools will have improved modulus of rupture, elasticity, and compressive strength." Conceding that they're about twice as expensive as tungsten carbides, Mr. Kibbitt asserts that oxides will permit substantial cost cutting by: 1. Reducing the machining cycle. 2. Extending tool life. 3. Improving surface finish to such a degree that subsequent grinding often can be eliminated.

Canadian Market

American executives optimistic about continuing market. Potential may justify expansion

CANADA is becoming an increasingly attractive market, indicates a survey by the National Industrial Conference Board.

Some 83 per cent of the 237 firms polled are active in Canadian sales. Showing confidence in the dominion's future, some survey participants plan to expand production and step up their sales efforts.

Subsidiary Situation — Over 110 respondents maintain separate subsidiaries in Canada. Most of them are totally owned. Many subsidiaries are on their own so that, as one executive puts it: "They can concentrate on problems without interference and adapt their operations to current market requirements."

Companies with subsidiaries favor them to eliminate import duties and red tape and to better their competitive positions. Subsidiaries meet the demand for goods made at home—the "Buy Canada" movement.

Some companies favor other approaches because "potential sales in Canada do not justify the subsidiary." One group thinks Canada is so close that there is no need. Over one-half of those companies directly solicit that country's users; others sell through home agents, distributors, or dealers.

Licensing Approach — Canadian industry is licensed by 12 of the respondents to manufacture and sell their products. They pay a royalty or percentage based on sales. Regular export or international sales departments handle sales for 10 of the firms surveyed.

"Not active in soliciting Canadian trade," say 41 of these companies. Some have had troubles, mainly tariffs; others feel that they would be overextending.

1st Choice

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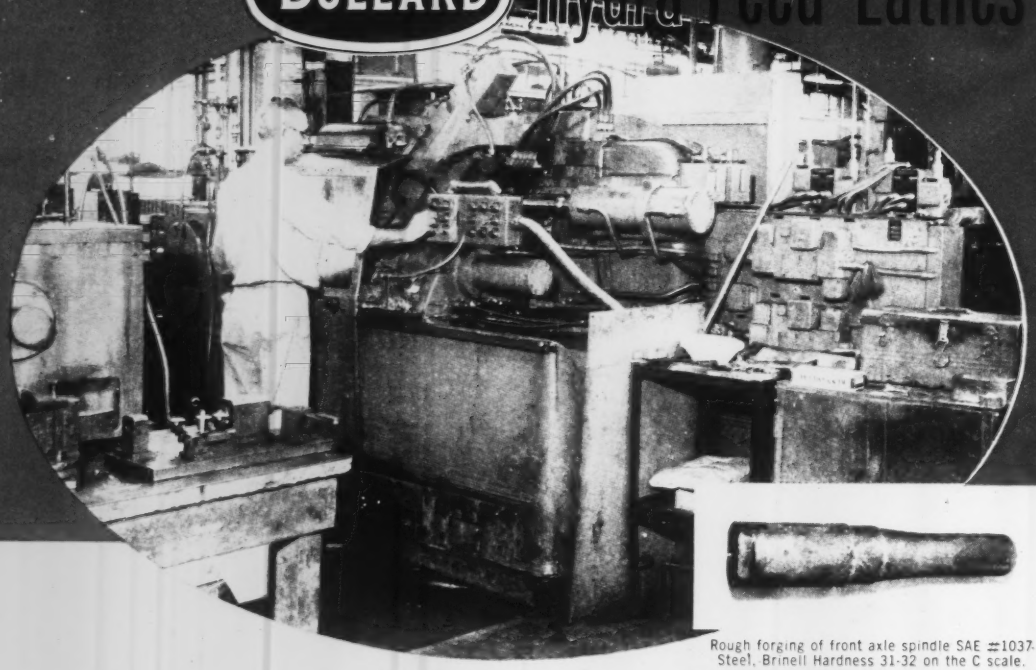
BULLARD Hydra-Feed Lathes



Rough forging of front axle spindle SAE #1037. Steel, Brinell Hardness 31-32 on the C scale.

The Senior Engineer at one of the leading motor car manufacturers in Detroit, was looking for a tracer lathe that went beyond his immediate requirement and offered easy conversion to other uses in years to come, to give longest tool life, to do the job with a minimum of shutdown time, to handle future developments in the realm of cutting tools, to reduce scrap to a minimum.

The answer to this multiple problem, according to the Senior Engineer was "BULLARD HYDRA-FEED TRACER LATHES."

We invite you to investigate the advantages which Bullard Hydra-Feed Lathes, either tracer or multiple tool models, offer you. Phone or write your nearest Bullard Sales Office, Distributor or

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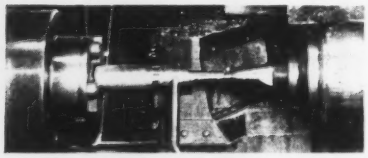
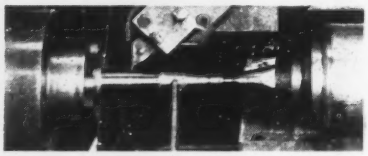
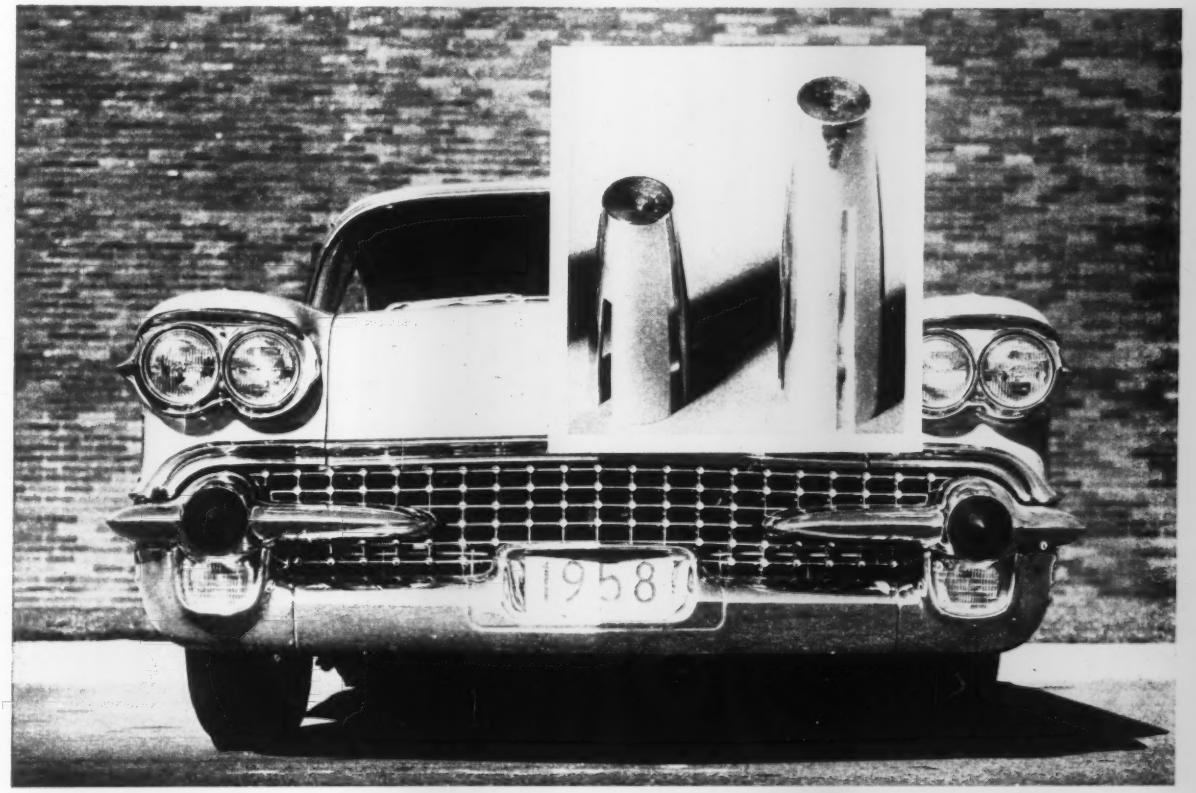


Rough turning with Rear Tracer Slide.



Finish turning with Right-Hand Top Tracer Slide

Finished piece complete cycle time — 65 seconds.



Two sizes of ornaments are clipped to horizontal and vertical aluminum strips

Making Cadillac's Grille

Doehler-Jarvis impact extrudes aluminum ornaments for the GM division—believed to be first time tapered cylindrical parts have been successfully extruded in the U. S.

CADILLAC Div., General Motors Corp., is using cold impact extruded aluminum ornaments on its 1958 grilles. Doehler-Jarvis Div., National Lead Co., Toledo, Ohio, is doing the job at its Grand Rapids, Mich., plant.

Clarence Morphew, staff engineer, production engineering, initiated the extruded ornament design a year and a half ago when he was with Cadillac's body engineering group. "We call these ornaments clothespins," he says. Cadillac uses 50,000 to 60,000 ornaments daily and carries a two or three day backlog.

Big Wash—Some 80 clothespins (59 large and 21 small) fit over 25 vertical and six horizontal strips in each 15-lb grille. Mr. Morphew explains the division uses Grade 1145 aluminum because it's easy to extrude and gives a good finish.

The inset photograph (above) shows how ornaments are assembled on grille strips. A rubber insert is wedged under the ornament to keep it from rattling and a retainer clip holds the piece on the grille.

With this setup, individual ornaments can be changed without replacing the whole grille. Mr. Morphew says Cadillac prefers aluminum for grilles because it has had trouble with plated diecastings. The division switched to aluminum grilles in 1954.

Materials—Two blanks are used. One is 5/16 in. thick and $\frac{7}{8}$ in. in diameter. It's formed into a clothespin slightly over 3 in. long with a $\frac{7}{8}$ in. diameter tapering to $\frac{5}{8}$ in. at the front end. A 20/32 in. thick slug is extruded into a 2-in. ornament. Diameters are the same as those of the longer part.

The original impact extrusion dies were developed in Germany and later improved by Doehler-Jarvis engineers. They believe this is the first time tapered cylindrical parts have been successfully extruded in this country. Here is the operation cycle:

Forming—Blanks are extruded into cylinders on a 120-ton impact extrusion press. The diameter of the cylinder after this operation is equal

(Material in this department is protected by copyright, and its use in any form without permission is prohibited.)

to the largest diameter of the finished piece.

A second 120-ton machine pushes the cylinder into a tapered die which forms it into a cone. An ejector pin indents the closed end of the part and pushes it out of the die.

Both presses have a gross cycling rate of 3000 pieces per hour. Parts are automatically fed and transferred between the machines.

The formed cylinders are trimmed by a pair of rotary shears. The big ornament is placed on a mandrel and cutters come in simultaneously to strike out all four slots. A semi-automatic machine with two press motions is used to slot the small ornament.

After slotting, the ornaments are buffed in the Grand Rapids plant and shipped to Cadillac for anodizing (gold or silver). The division has two other secondary suppliers who make stamped ornaments.

Romney Romps at Hearing

Fighting mad, George Romney, American Motors Corp. president, provided Sen. Estes Kefauver's (D., Tenn.) Antitrust & Monopoly Subcommittee with a different view of the auto industry last week.

Admitting that "many" of Walter Reuther's principles "are the same" as his own, Mr. Romney implied the Big Three of autodom are tending to stagnate: "Billionaires don't pioneer." He wants the Sherman Act amended to provide for birth of new corporations when one company gains 35 per cent of the sales of its industry. If the company is engaged in more than one "basic" industry, then the percentage of allowable market in one industry should be reduced to 25 per cent.

New Opportunity — Citing his own experience in the aluminum industry and the breakup of the old Standard Oil into 34 companies, Mr. Romney suggested second and third tier executives in the large companies might welcome the chance to become first line executives in new companies formed under his proposed amendment.

At least two new companies, perhaps three, would come out of a breakup of General Motors Corp. and Ford Motor Co., he said.

Defense and S-P — A derivative of Mr. Romney's appearance before the subcommittee may be a detailed investigation of Defense Department procurement practices, particularly with reference to the auto industry. Mr. Romney expressed extreme disappointment about the treatment of AMC because of defense contracts recently granted Studebaker-Packard Corp. This "subsidization" is not the right way to keep competition in his industry, he said. AMC is "pulling out of the defense field, getting rid of its organization and personnel" as a result of the S-P deal and the "favored" treatment of Ford on unit construction applications for military vehicles. Ford hired AMC personnel to handle the defense contract in that field, charged Mr. Romney.

Look for the Big Three to ignore the split-up phase of Mr. Romney's proposals. They're apt to have more to say about his recommendations to divide union strength by putting limitations on joint bargaining.

Autodom thinks the ultimate chance for success of the "Romney Plan" is zero. Immediate results: Headlines for AMC. Ammunition for Mr. Reuther. Silence from the Big Three.

Air Springs Cut Weight

Tractor weight can be cut almost a ton if the vehicles are designed around air suspension systems, says GMC's Truck & Coach Div., Pontiac, Mich.

Donald J. LaBelle, GMC truck engineer, has told California truck owners and fleet operators that air suspension will absorb most of the high frequency road vibrations and shocks; so structural strength requirements on truck tractors can be reduced.

"This means lightweight materials such as aluminum, magnesium, and reinforced plastics can be substituted for steel," says Mr. LaBelle.

The new GMC concept of a heavy duty highway tractor includes these features:

- Unloaded weight reduced nearly 2000 lb.
- Fifth wheel and trailer floor 5 in. lower, using air suspension and low profile tires.
- Constant floor height for easier loading and unloading.

Mr. LaBelle points out GM coach operators have logged over 1 billion miles with air suspension. "You couldn't sell them the old leaf spring again at any price," he claims.

U. S. Auto Output

Passenger Only

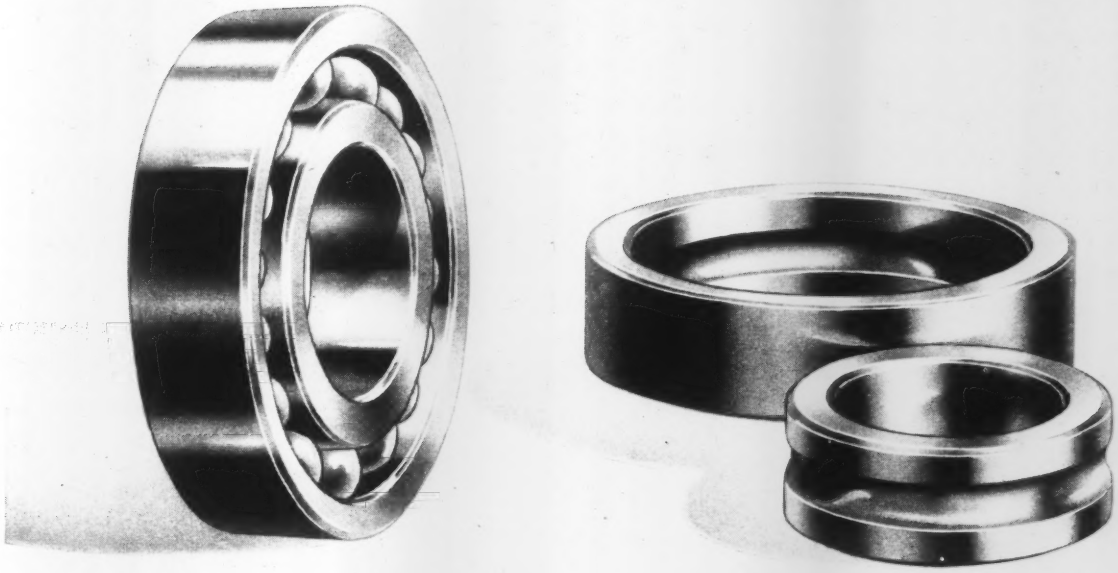
	1958	1957
January	489,357	642,089
February		571,098
March		578,826
April		549,239
May		531,365
June		500,271
July		495,629
August		524,354
September		284,265
October		327,362
November		578,601
December		534,714
Total		6,107,813

Week Ended	1958	1957
Jan. 11	120,140	147,129
Jan. 18	109,761	145,761
Jan. 25	107,495	145,191
Feb. 1	104,359	140,411
Feb. 8	107,261†	147,163
Feb. 15	105,000*	145,846

Source: *Ward's Automotive Reports.* †Preliminary. *Estimated by STEEL.

Exhaust Notes

- Chrysler Corp. has made a running change on its turn signal lever. The lever is now made from anodized aluminum screw machine stock instead of steel. Significance: Aluminum has been avoided as unworkable by partmakers using screw machines. Chrysler's shift may mean more business.
- AC Spark Plug has set up an engineering staff in Los Angeles to coordinate projects with west coast missilemakers.
- Merritt D. Hill, general manager of Ford's Tractor & Implement Div., says sales of tractors and farm equipment will hold steady at 1957 levels. Sales last year increased 19 per cent over 1956's, Mr. Hill reports.
- Ford Motor Co. also gives this estimate of tin used in average '58 vehicles: Ford passenger car and truck, 1.5 lb; Edsel, 2.2 lb; Mercury, 2.5 lb.
- Oldsmobile is showing a portable TV set for autos. It has a 9-in. screen and is still in the engineering stage.



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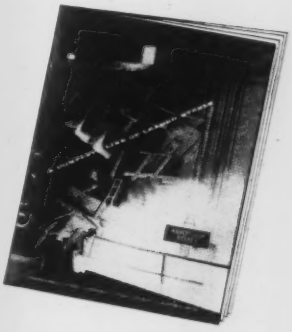
Available in 52100, 4620, 4720, 8620, and 4320, Aristoloy can be furnished in hot rolled or cold drawn, annealed (spheroidized annealed where required), rough turned, and turned, ground and polished. For assistance in selecting the best Aristoloy for your job, call or write. A qualified Copperweld Field Metallurgist will be glad to work with you.



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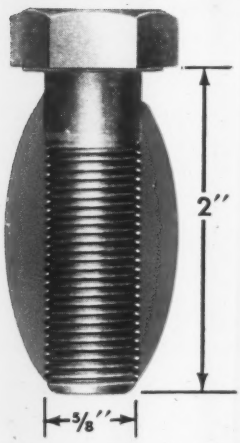
ARISTOLOY STEELS

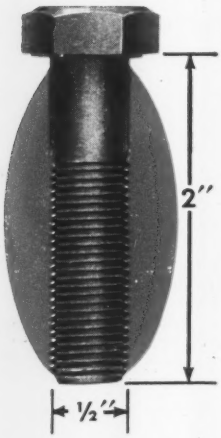
IT ISN'T

"how big"...



BUT...

"how strong!"



Two Cap Screws . . . both the same length but one with a larger diameter than the other. If you were buying or specifying Cap Screws of this length, where maximum tensile strength was required, which would you choose?

Be careful! It's easy to jump to the wrong conclusion. Actually the Cap Screw with the smaller diameter is the best buy from every standpoint. It has greater tensile strength, costs less and makes possible a lighter, stronger assembly. Why? Because the smaller diameter Cap Screw is a Lamson & Sessions 1038 Double-Heat Treated Cap Screw while the other is the ordinary low carbon Full Finshed Cap Screw.

This is one of many instances where Lamson & Sessions can help you make the *right choice* when you have a fastener problem. As manufacturers of over 20,000,000 fasteners a day, backed by nearly a century of experience making fastener products, you can bank on Lamson salesmen and engineers to give you the right answers . . . *every time!*

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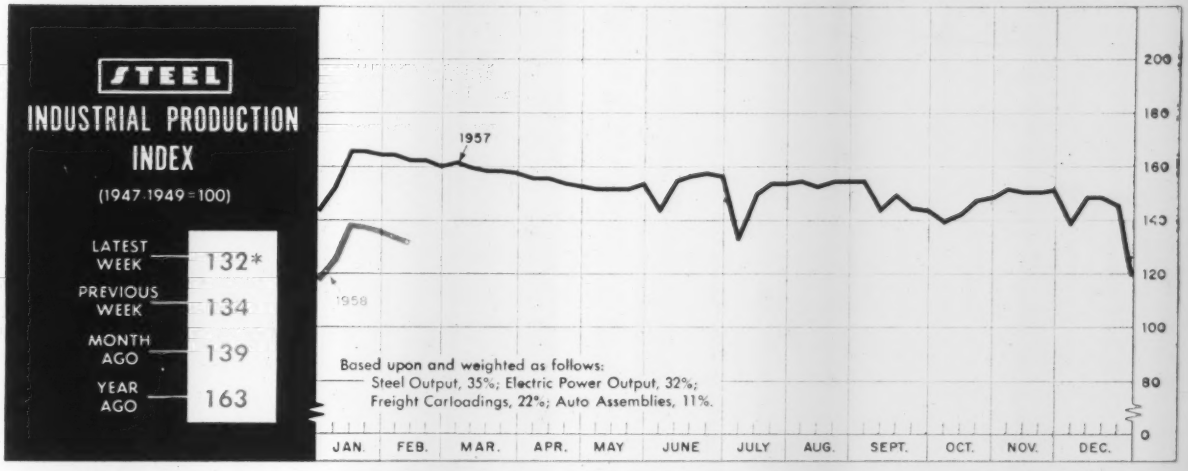

*Week ended Feb. 8.

Orders for Early Spring Pickup Lacking

IF TALK has anything to do with it, the tide of business should turn up in March. But it takes new orders—and lots of them—to support an upswing, and the latest information is not encouraging.

Many economists and businessmen continue to predict an early upturn—maybe next month, but certainly by midyear. They base their optimism on the standard list of strengths in the economy: Strong consumer and business confidence in long term growth prospects; expanding population; a high level of personal income; increasing federal, local, and state expenditures; easing of credit conditions; completion of the inventory adjustment; a slight upturn in residential construction; a leveling off of the inflation trend.

Both Sides—That's a pretty impressive list but it is merely establishing the basis for the recovery later on, says William Martin, chairman of the Federal Reserve Board. In the immediate future, he sees the possibility of a longer and deeper recession than many are anticipating.

To that, the president of Prudential Insurance Co. of America, Carrol M. Shanks, replies: "Bill Martin has access to lots of information, but no more than I have. We know that people buy when they have to, and we know that they are running out of goods now." Mr. Shanks feels that the upturn in steel will come next month.

Spring, Summer, Fall? — Most guesses for the upturn center on three seasons. There is some historical basis for spring and fall turning points, but you have to look pretty hard to find a downturn which reversed itself between June and August.

Right now, the odds are against much of a resurgence this spring. New orders are still sluggish. (See chart, Page 92.) Orders in December (which result in shipments three, four, or more months in the future) were only $11.6 billion, seasonally adjusted, and the lowest level since November, 1954. Manufacturers

BAROMETERS OF BUSINESS

	LATEST PERIOD*	PRIOR WEEK	YEAR AGO
INDUSTRY			
Steel Ingot Production (1000 net tons)[2]	1,449[1]	1,457	2,501
Electric Power Distributed (million kw-hr)	11,850[1]	12,238	12,019
Bituminous Coal Output (1000 tons)	8,130[1]	8,258	8,775
Crude Oil Production (daily avg—1000 bbl)	6,900[1]	6,842	7,461
Construction Volume (*ENR*—millions)	$322.9	$389.7	$428.5
Auto, Truck Output, U. S., Canada (*Ward's*)	132,880[1]	130,961	179,776
TRADE			
Freight Carloadings (1000 cars)	545[1]	550	665
Business Failures (Dun & Bradstreet)	326	333	320
Currency in Circulation (millions)[3]	$30,579	$30,652	$30,595
Dept. Store Sales (changes from year ago)[3]	−2%	−3%	+4%
FINANCE			
Bank Clearings (Dun & Bradstreet, millions)	$22,610	$22,509	$22,392
Federal Gross Debt (billions)	$274.4	$275.0	$276.0
Bond Volume, NYSE (millions)	$24.2	$25.7	$20.3
Stocks Sales, NYSE (thousands of shares)	12,371	10,754	10,438
Loans and Investments (billions)[4]	$86.2	$86.5	$85.3
U. S. Govt. Obligations Held (billions)[4]	$25.9	$25.9	$26.1
PRICES			
STEEL's Finished Steel Price Index[5]	239.15	239.15	225.92
STEEL's Nonferrous Metal Price Index[6]	201.0	201.1	246.9
All Commodities[7]	118.5	118.7	117.1
Commodities Other than Farm & Foods[7]	125.7	125.9	125.3

*Dates on request. [1]Preliminary. [2]Weekly capacities, net tons: 1958, 2,699,173; 1957, 2,559,490. [3]Federal Reserve Board. [4]Member banks, Federal Reserve System. [5]1935-39=100. [6]1936-39=100. [7]Bureau of Labor Statistics Index, 1947-49=100.

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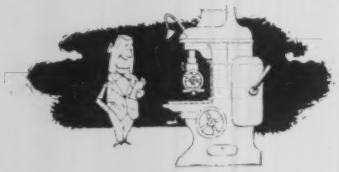

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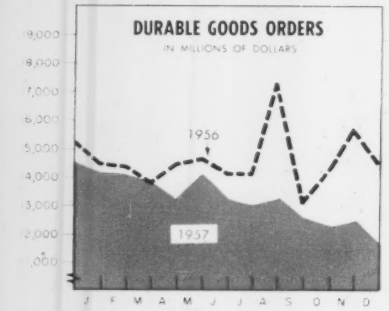
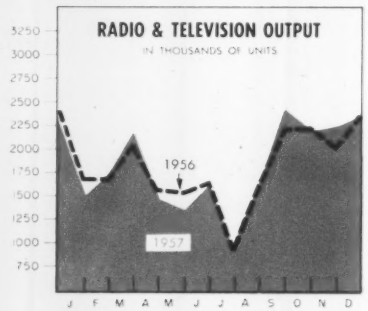
THE BUSINESS TREND





	New Orders* 1957	New Orders* 1956	Sales* 1957	Sales* 1956
Jan.	14,176	14,449	14,941	13,832
Feb.	14,102	14,374	14,808	13,824
Mar.	13,853	13,771	14,198	13,252
Apr.	13,234	14,468	14,254	13,723
May	14,115	14,654	14,296	13,570
June	13,249	14,093	14,207	13,587
July	13,005	14,087	14,573	13,021
Aug.	13,160	17,342	14,297	13,723
Sept.	12,519	13,042	14,132	13,449
Oct.	12,154	14,312	13,932	14,393
Nov.	12,400†	15,776	13,505†	14,249
Dec.	11,600†	14,543	13,100†	14,526

*Seasonally adjusted. †Preliminary.
U. S. Office of Business Economics.

	Radio 1957	Radio 1956	Television 1957	Television 1956
Jan.	1,085	1,079	450	588
Feb.	1,265	1,094	465	576
Mar.	1,609	1,360	560	680
Apr.	1,116	993	361	550
May	1,024	1,060	342	468
June	1,088	1,073	544	553
July	613	567	360	337
Aug.	966	991	674	613
Sept.	1,611	1,319	833	894
Oct.	1,569	1,349	662	821
Nov.	1,689	1,382	575	680
Dec.	1,793	1,715	573	627
Totals	15,428	13,982	6,399	7,387

Electronic Industries Association.

Charts copyright, 1958, STEEL.

have not noticed any significant improvement since then. Even the steel producers can't see much more than a slight increase in March operations.

Unless an unexpected surge in consumer durable and military buying shows up during the next two or three months, summer must be ruled out for an upturn. It is normally the soft season—hot weather, vacations, strikes.

Could Be Autumn—That leaves the late third or early fourth quarter. Historically, the period after Labor Day sets the pace for a fall pickup, which was not the case in 1957, but there is a good chance it will happen this year.

Railmen See Improvement

At least two railroad officials see some early improvement in freight carloadings, which have been as much as 17 or 18 per cent off the 1957 pace this year. H. C. Murphy, president of Chicago, Burlington, & Quincy Railroad, thinks loadings during the first quarter will be about 5 per cent below those of the year-ago period for his road. In early February, the deficit was running to about 8 per cent, so March should be better.

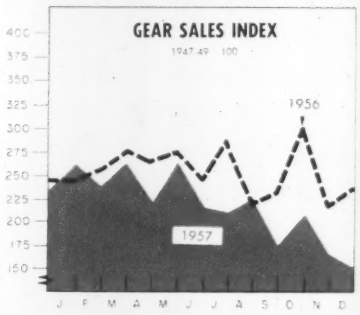
David O. Mathews, president of Chicago & Eastern Illinois Railroad, believes that the bottom of the recession has been reached. "We have already noticed increases in various types of business which indicate that carloadings may continue to increase from here on," he states.

If there has been any improvement in the midwest area, it has been canceled out by declines elsewhere. Carloadings for the nation's railroads during the week ended Feb. 1 totaled only 550,426 cars, reports the Association of American Railroads. It was the lowest total in several years, not counting holiday weeks.

Unemployment Up Again

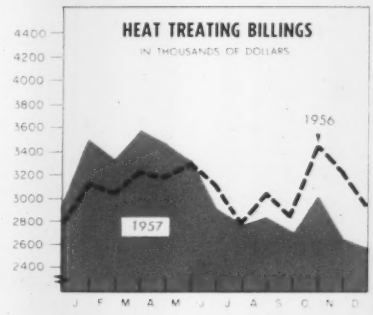
Unemployment increased from January to February, according to preliminary estimates of the Labor Department, reaching close to 4.5 million. But Robert C. Goodwin, director of the department's Bureau of Employment Security, says the figure will start down in March. The decline will be slow, at least through July.

Some important points are often overlooked in the unemployment picture. 1. As unemployment rises,



	1957	1956	1955
Jan.	259.3	245.5	140.9
Feb.	239.5	256.2	148.5
Mar.	262.4	276.5	172.8
Apr.	221.7	264.7	179.8
May	263.2	275.6	205.2
June	215.9	245.4	193.5
July	211.4	286.7	201.7
Aug.	225.8	219.5	217.6
Sept.	174.9	230.5	246.5
Oct.	207.0	299.8	227.6
Nov.	165.3	216.2	210.4
Dec.	150.8	235.7	245.5
Avg	216.4	254.4	198.3

American Gear Mfrs. Assn.



	1957	1956	1955
Jan.	3,494.7	3,116.4	2,181.0
Feb.	3,337.9	3,124.8	2,184.5
Mar.	3,571.6	3,330.9	2,599.5
Apr.	3,462.6	3,166.2	2,579.5
May	3,311.4	3,350.7	2,644.4
June	2,912.1	3,094.5	2,645.1
July	2,767.5	2,737.4	2,180.0
Aug.	2,830.8	3,136.6	2,535.6
Sept.	2,708.8	2,858.6	2,666.8
Oct.	3,021.6	3,468.5	2,897.2
Nov.	2,641.4	3,238.2	2,935.7
Dec.	2,565.4	2,998.9	2,891.1

Metal Treating Institute.

so do unemployment compensation and SUB payments. Mr. Goodwin estimates that a peak of 2.9 million persons will collect state unemployment payments this month. 2. A large percentage of those payments will be made to women. In the Cleveland area, women accounted for 27 per cent of continuing claims in December. The figure will probably be higher in January, reflecting the cutbacks in retail employment following Christmas. 3. It can be assumed that a good percentage of those women are married and that their husbands are either working or also drawing some kind of unemployment benefits. While the total of this compensation is far from the wages these people have been earning during the boom, it still establishes a limit to the effects of a recession.

Index Continues Down

STEEL's industrial production index declined (for the fourth time in a row) during the week ended Feb. 8. (Discounting recoveries from holiday weeks, the trend has been downward since the week ended Nov. 23.) The preliminary total for the latest period was 132 (1947-49=100). It represents a drop of over 21 per cent since the record of 168 was set in December, 1956. The recession of 1953-54 cut back only 16.5 per cent on the index.

The only segment to show an increase during the latest week was auto output. *Ward's Automotive Reports* says producers turned out 125,736 cars and trucks, up about 3000 units from the previous week. However, the industry faces further production cuts as stocks of unsold cars mount. The original goal of 1.7 million units for first quarter now has been slashed to 1,418,000—and it may go lower if sales don't pick up.

Construction Record Set

The construction industry is still setting records despite the declines elsewhere. Expenditures in January set a record for that month at $3,285,000,000—3 per cent above the corresponding 1957 figure. Private construction increased 2 per cent and public work jumped 6 per cent in the same time. The decline of 10 per cent from the December level was seasonal. At a seasonally adjusted annual rate, January set a hot pace of $48.5 billion, compared with actual outlays of $47.3 billion last year.

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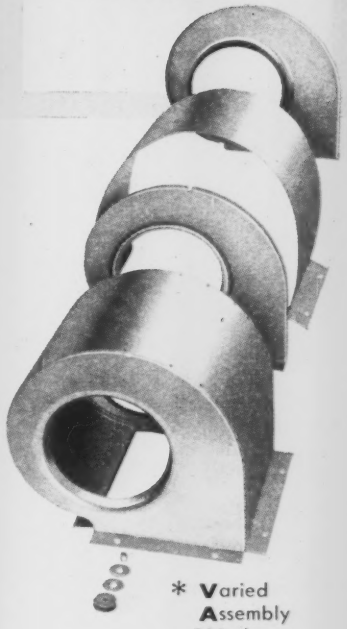

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JOHN H. CORSON
Carpenter div. mgr.

JAMES A. NISSEN
Denver Equip. sales post

JOHN S. LUND
Lewis-Shepard p. a.

CARTER L. BURGESS
AMF president

John H. Corson, former manager of **Carpenter Steel Co.'s** research laboratory, was appointed manager of its Webb Wire Div., New Brunswick, N. J.

James A. Nissen was made general sales manager, **Denver Equipment Co.**, Denver. He has been a Deco dealer in the San Francisco area for the last two years, and was president of James A. Nissen Co., which he organized in 1948.

A. B. Aycock was named plant superintendent for **Southern Pipe Coating Co.**, Atlanta. He was superintendent of production at Mayes Bros. Inc.

Arthur B. Williams was named sales manager, **Engineered Electronics Co.**, Santa Ana, Calif. He was assistant to the sales manager, Wright Engineering Co. He succeeds **Robert A. Bailey.**

Lester G. Evans was appointed general sales manager, **Axelson Mfg. Co.**, Los Angeles, division of U. S. Industries Inc. **K. S. Ramey**, former sales manager, was promoted to assistant to the president.

Robert S. Root was appointed chief engineer, clutch and machine tool divisions, **Lipe-Rollway Corp.**, Syracuse, N. Y. Former chief engineer of the clutch division, he succeeds **E. R. Fish**, chief engineer, machine tool division.

Black & Decker Mfg. Co., Towson, Md., elected **J. Early Hardesty** vice president-treasurer; **George W. McCarty**, vice president-research and development.

John S. Lund was appointed purchasing agent, **Lewis-Shepard Co.**, Watertown, Mass. He succeeds **Frank A. Gray**, retired. Previously a buyer, Mr. Lund is responsible for all activities of the purchasing department. **Mrs. Marie Gibson** was named to the new post of assistant purchasing agent.

Dr. Edward G. Pickels was made acting manager, **Spinco Div.**, Beckman Instruments Inc., Palo Alto, Calif. He continues as director of research for Spinco. **Maurice C. Hanafin**, former Spinco manager, was named manager of the Beckman Shockley Semiconductor Laboratory.

Waterman Engineering Co., Evanston, Ill., separated it sales department into an industrial and an aircraft division. **Edward E. Braun** was made sales manager, industrial division; **Harry A. Hedland**, sales manager, aircraft division.

George N. Malcolm was appointed general manager, **Ward LaFrance Truck Corp.**, Elmira, N. Y., subsidiary of Glen Alden Corp. He succeeds **F. N. Tracy**, Ward LaFrance's president, who resigned.

Minneapolis-Moline Co., Minneapolis, elected: **J. Russell Duncan**, president; **Wayne H. Mac Farlane**, vice president-administration; **Stacy L. Angle**, vice president-treasurer; **D. C. Steinhelber**, secretary; **William F. Foss**, controller. **George D. Dodson**, western regional manager (Los Angeles), was named parts manager, with headquarters at Hopkins, Minn.

Carter L. Burgess was elected president, **American Machine & Foundry Co.**, New York. He was president of Trans World Airlines.

Thomas W. McNeill was made director of procurement, **American Radiator & Standard Sanitary Corp.**, New York. He was in charge of the air conditioning division.

Ohio Injector Co., Wadsworth, Ohio, named **G. Richard Winder** vice president-marketing to succeed **William G. Shepard**, resigned. Mr. Winder was with Chiksan Co.

Robert B. Kurtz was appointed manager of manufacturing, general purpose control department, **General Electric Co.**, at Bloomington, Ill. Formerly manager-manufacturing engineering for the department, he succeeds **F. C. Fisher**, named general manager of GE's ballast department at Danville, Ill.

Albert J. Bruner was made director of purchasing, **American Metal Specialties Corp.**, Hatboro, Pa.

B. W. Norton, a vice president of **Shenango Furnace Co.**, Pittsburgh, was named to direct operations at the centrifugally cast products division in Dover, Ohio. He continues headquarters at the Sharpsville, Pa., operations. **Herbert H. Zollar** continues as general manager at Dover. In addition, Mr. Norton will supervise operations at Shenango's newest acquisition, Lucerne Coke Co., Indiana, Pa., now a subsidiary. **A. L. Fairley Jr.**, Shenango's vice president-raw materials, was made responsible for all

TIM J. BUCKLEY J. E. JOHNSON CARL E. BORNER

executive changes at Nylok Corp.

outside sales of the various grades of coke produced by Lucerne.

Nylok Corp., Paramus, N. J., named **Tim J. Buckley** vice president and general sales manager. He was vice president-manufacturing. **J. E. Johnson**, vice president-engineering, becomes vice president-production. **Carl E. Borner**, former northeastern sales manager, was appointed vice president-engineering, succeeding Mr. Johnson.

E. D. Mairs and **Hugh J. Morrison** were named assistant general managers, fabricating division, **Aluminum Co. of America**, Pittsburgh. **J. T. Barclay** succeeds Mr. Mairs as works manager, Lafayette, Ind., Works. Mr. Morrison is succeeded as Cleveland works manager by **I. S. Dow**, Detroit works manager. Succeeding Mr. Barclay as Vancouver, Wash., fabricating works manager is **W. J. Jenkins**, who is replaced by **R. C. Blasingame** as assistant works manager, Cressona, Pa., fabricating plant.

Fred G. Wehe Jr. was named assistant to the vice president, **Overly Mfg. Co.**, Greensburg, Pa. He is succeeded as sales engineer in the architectural sheet metal department by **F. C. Petters**.

Sidney Wade was made manager, distributor products, for **Linde Co.**, division of Union Carbide Corp., New York. He continues as manager of the gas apparatus department, with added responsibilities for marketing of all Linde products.

Charles A. Barnes was appointed controller for **P. R. Mallory & Co. Inc.**, Indianapolis. He succeeds **G. M. Arisman Jr.**, recently made president of Mallory Battery Co., Cleveland, a division.

J. H. Dalton, former vice president, Fairchild Camera & Instrument Corp., joined **Servo Corp. of America**, New Hyde Park, N. Y., as assistant to the president.

Fred Kohler was appointed director of research for **New Rochelle Tool Corp.**, New Rochelle, N. Y. He was design engineer for Induction Heating Co.

Carl M. Beach was named general manager, **Heald Machine Co.**, Worcester, Mass., subsidiary of **Cincinnati Milling Machine Co.**, Cincinnati. He was sales manager of the parent firm and vice president of Cincinnati Milling & Grinding Machines Inc., sales subsidiary. **Robert C. Bevis**, assistant sales manager, parent firm, was promoted to sales manager. **Lawrence H. Cousineau** was appointed vice president of Cincinnati Milling. He continues as vice president of Heald, where he also served as assistant general manager.

David P. Dick, associated with the eastern manufacturing division of **Trane Co.**, Scranton, Pa., was promoted to purchasing agent.

D. Neil Rodger was made industrial sales manager; **Kenneth F. Ford**, national sales manager of the Electro Minerals Div., **Carborundum Co.**, Niagara Falls, N. Y.

Daniel D. Hafle was made central Ohio district sales manager by **Acme-Newport Steel Co.** He has offices at Springfield, Ohio.

Huntley M. Campbell was made sales manager, New York office, **Seymour Mfg. Co.** He was with Western Brass Products Metals, division of Olin Mathieson Chemical Corp. **Harold S. Samson**, previous New York branch manager, will remain as a consultant.

Ted A. Low was elected vice president-marketing, **Steel Warehousing Corp.**, Chicago. **F. G. Brydon** was made manager of sales; **Paul B. Gallagher**, manager, stainless steel division.

Joseph W. Corrigan was named vice president, **J. C. Corrigan Co. Inc.**, Boston.

Herbert W. Ziebolz was appointed co-ordinator of industrial systems and assistant to the vice president-engineering of **General Precision Equipment Corp.**, New York. He was vice president-engineering of the subsidiary, Askania Regulator Co.

R. Henry Seelaus was named sec-

CARL M. BEACH ROBERT C. BEVIS LAWRENCE H. COUSINEAU

Cincinnati Milling Machine promotions

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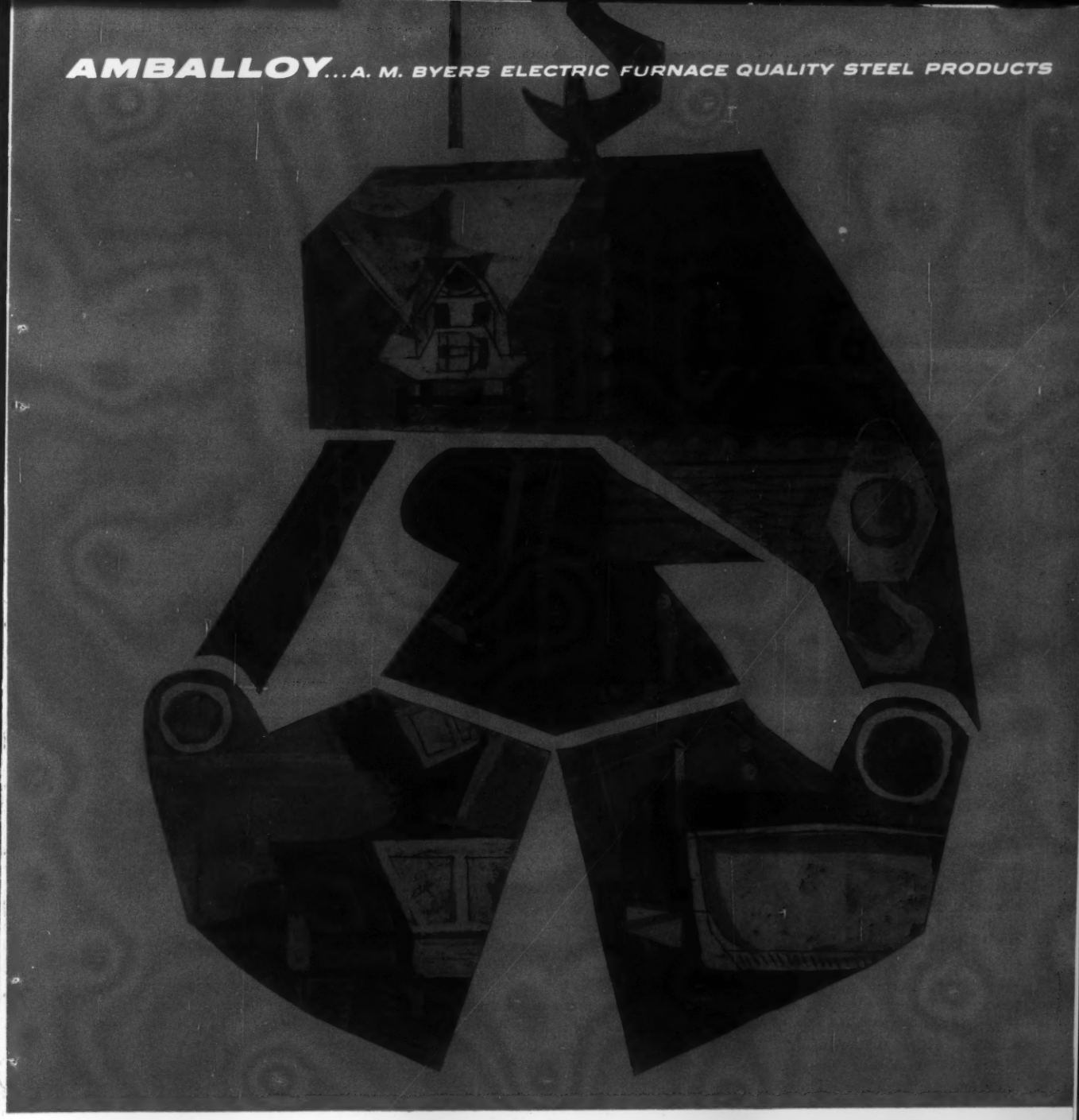

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NORBORNE BERKELEY
Bethlehem Corp. v. p.

JOHN W. EASON
Revere aluminum sales post

THOMAS HOLLIS JR.
Brown & Sharpe post

WILBERT H. ZUEST
Diehl div. sales mgr.

W. L. KILLEN
Downingtown Iron exec. v. p.

RAYMOND C. McCULLOUGH
Abrasive Dressing Tool post

retary-treasurer, **Fischer & Porter Co.**, Hatboro, Pa.

Wilbert H. Zuest was appointed manager, special product sales, **Diehl Mfg. Co.**, Somerville, N. J., electrical division of Singer Mfg. Co.

W. L. Killen was elected executive vice president, **Downingtown Iron Works Inc.**, Downingtown, Pa., division of Pressed Steel Tank Co. He was general manager of the division, which he joined in 1955. Mr. Killen previously was general manager, Chicago Steel Tank Co.

Van B. Phillips was promoted from assistant to general sales manager, **Recordak Corp.**, New York.

E. A. Henry was appointed manager of the newly organized industrial sales department of **Minneapolis-Moline Co.**, Minneapolis. In charge of sales functions for the department are: **David S. Hansen**, industrial dealer sales; **George W. Balch**, OEM sales; **Sidney R. Morrow**, government sales.

Raymond C. McCullough was made sales manager, **Abrasive Dressing Tool Co.**, Detroit. He was with Bohn Aluminum & Brass Corp.

A. D. McDade was appointed chief engineer, **A. A. Straub Co. Inc.**, Cleveland. He was process project engineer at Blaw-Knox Co.

Ward M. Troutman, Pittsburgh district sales manager, **General Refractories Co.**, was named vice presi- of the company. He remains in Pittsburgh.

Richard D. Morrison was named executive assistant to Emlyn Lloyd, director of purchasing for **Chrysler Corp.**, Detroit.

Frank Mohney joined **Automation Devices Inc.**, Erie, Pa., to direct sales for its Peeco and VFC Divisions. He was sales manager, Auburn Burner Co.

Gordon F. Thruselsen was made general sales manager at **Farr Co.**, Los Angeles.

Norborne Berkeley, executive of subsidiary companies of **Bethlehem Steel Corp.**, New York, was elected a vice president of the corporation.

John W. Eason was made manager-aluminum industry sales for **Revere Copper & Brass Inc.** He will be in New York. **James H. Corrigan Jr.** succeeds Mr. Eason as manager of aluminum sales at the Baltimore division. **Franklin F. Younger** succeeds Mr. Corrigan as district manager, Miami, Fla., sales office.

Thomas Hollis Jr. was named general manager of **Brown & Sharpe Mfg. Co.'s** new cutting tool division, which combines design, manufacture, and sale of high-speed steel and tungsten carbide cutting tools. The new organization continues manufacture of high-speed steel cutting tools at the Greystone, R. I., plant of Brown & Sharpe; and the manufacture of tungsten carbide cutting tools at the Manchester, Conn., plant of Nelco Tool Co., subsidiary. Sales for high-speed tools continue under the direction of **Colin Sharp**; the carbide products under **Lewis B. Main. W. P. Sheffield** continues as group superintendent, high-speed tool manufacture; **Robert Warfel**, recently made manager of Nelco, continues to head its operations.

William J. Young Jr., Chicago branch sales manager for Republic Steel Corp.'s **Berger Div.**, was named assistant sales manager for steel equipment products. He is in Canton, Ohio.

Dean Daniels was made western district sales manager for **General Electric Co.'s** silicone products department at Downey, Calif. He succeeds **Robert T. Dailey**, now manager-rubber market development for the department.

Robert Griffith was made general manager, **National Asphalt Corp.**, Cleveland. He was general manager, Revere Chemical Corp.

Martin K. Schnurr Jr. was appointed assistant to the general sales manager, stainless steel division, **Jones & Laughlin Steel Corp.**, at Detroit.

James E. Spearman, former assistant to the president, was appointed sales manager, **Vaughn Machinery Co.**, Cuyahoga Falls, Ohio. **Paul J.**

Stainless Steel Service
the Ingersoll way

Service is a word that gets kicked around a lot—often tossed off lightly and loosely. But here at Ingersoll Steel, *service* is a word we live by.

It means, for example, tailoring our production schedules to *your* requirements. It means producing to your exact analysis, size and thickness specifications. It means quality control to assure uniformly high quality from one order to the next, so you can depend on the fabricating characteristics you expect. It means deliveries timed to your production needs. It means providing technical information whenever required.

So next time you need stainless sheets or plates —solid, heat-resisting, or clad—call Ingersoll Steel and get a new slant on *service*.

Our telephone number is New Castle (Indiana) 132

Ingersoll STEEL DIVISION
Borg-Warner Corporation
New Castle, Indiana

HOWARD H. DEEM
Valvair dir.-manufacturing

VINCENT J. RODDY
American Screw president

HARRY G. HILK
Clearing Machine gen. supt.

BERNARD MAYER
Gulton battery div. post

Kunkler was made assistant sales manager.

Howard H. Deem was made director of manufacturing for **Valvair Corp.** and **Sinclair-Collins Valve Co.**, Akron. He was supervisor of the plant and manufacturing engineering section of Ford Motor Co.'s Cleveland foundry.

Henry C. Ashley was appointed metallurgical director at the **Chase Metal Works** plant of Chase Brass & Copper Co., Waterbury, Conn., subsidiary of Kennecott Copper Corp. He succeeds **Benjamin H. McGar**, retired.

Globe Brick Co., East Liverpool, Ohio, appointed **David B. Baxter** to its sales staff. He was with Basic Inc.

Vern J. Carrier was made sales manager, **National Iron Co.**, Duluth. He was with B. F. Goodrich Industrial Products Co.

Ralf L. Leaf was made product development supervisor, expanded metal division, **Penn Metal Co. Inc.**, Parkersburg, W. Va.

Gerald McIntosh was appointed director of engineering, **Kendell Mfg. Co.**, San Diego, Calif.

Andrew J. Cappola was named vice president-general manager, **Cutler Iron Works**, Los Gatos, Calif.

S. A. Lang was elected vice president, **Aidlings Inc.**, Brooklyn, N. Y. He is in charge of customer relations.

G. K. Willecke was made director of research, **Miller Electric Mfg. Co. Inc.**, Appleton, Wis.

Vincent J. Roddy was elected president, **American Screw Co.**, Willimantic, Conn. He was executive vice president.

Harry G. Hilk joined **Clearing Machine Corp.**, division of U. S. Industries Inc., as general superintendent, Chicago plant.

Robert K. Esler succeeds the late **J. L. McGinnis** as St. Louis district sales manager, **Allegheny Ludlum Steel Corp.**

Petch Mfg. Co., Alpena, Mich., appointed **B. G. Barton** Detroit district sales supervisor; **R. W. Hughes**, Michigan district sales supervisor.

Gilbert H. Tompkins heads the newly formed management engineering department of **Vulcan Materials Co.**, Birmingham.

Ralph C. Dietrich was appointed sales manager, structural steel division, **Milwaukee Bridge Co.**, Milwaukee.

William F. Pravel was made supervisor-tool steel development in the application and development department of **Allegheny Ludlum Steel Corp.**, Pittsburgh.

Hugo G. Becker Jr. was appointed southern regional manager for **Latrobe Steel Co.** He is at Tampa, Fla.

John L. Hallett was made assistant general manager, heavy construction division, **Henry J. Kaiser Co.**, Oakland, Calif.

Francis S. Gregory was elected assistant treasurer of **Atlantic Steel Co.**, Atlanta. He continues as assistant secretary.

Bernard Mayer was made general manager, Alkaline Battery Div., **Gulton Industries Inc.**, Metuchen, N. J. He was assistant to the president.

Tom L. Murray was named sales manager, warehouse division, **Levinson Steel Co.**, Pittsburgh. **James C. Levinson** was named contract manager, fabrication division.

C. E. Russell was appointed steel division plant manager of the Ambridge, Pa., plant of **National Electric Products Corp.**

Ralph M. Buzard was elected vice president, motor truck division, **International Harvester Co.**, Chicago. He was general manager.

Mats-Olaf Macklin was appointed liaison development engineer for **Hays Corp.**, Michigan City, Ind.

J. J. Schofield, controller, **Detroit Harvester Co.**, Detroit, was elected a vice president.

OBITUARIES...

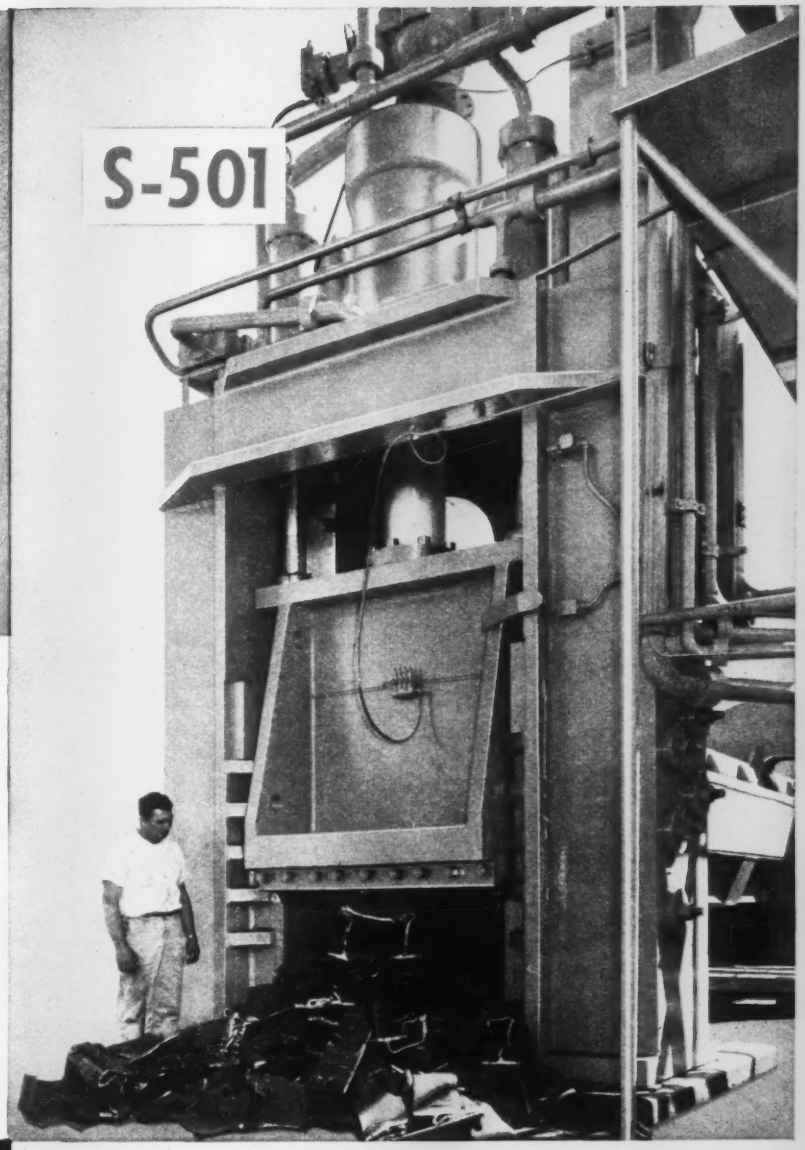
Henry Davis, 47, assistant to vice president-sales, eastern division, and manager of its market research department, **Colorado Fuel & Iron Corp.**, died Feb. 1 in New York.

Harlow Adams, president, **Adams Co.**, Dubuque, Iowa, died Jan. 29.

Clinton R. Boothby, 57, chief electrical engineer, **Electric Auto-Lite Co.**, Toledo, Ohio, died Jan. 26.

Herbert L. Schultz, 59, owner, **H. L. Abrasive Products & Equipment Co.**, Tonawanda, N. Y., died Jan. 29.

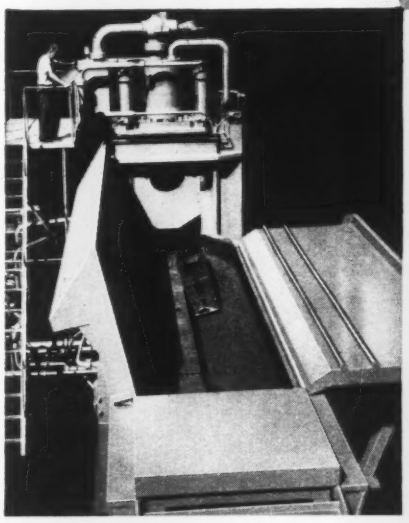
CUTS 200 TONS PLATE SCRAP IN EIGHT HOURS



production is continuous

labor costs 70% lower

The Harris Shear is revolutionary in design. It is the first new development in the scrap industry since the introduction of the Baling Press. Railroad scrap, pipe, farm, industrial, automobile and miscellaneous junk shop scrap work through on a 12 second cycle. A 3 man crew and a crane handle the job in all kinds of weather.



The charging box is 264" x 80" x 30". It has a flat type loading hopper. The cover and charging ram operate like a baler. This means more material under each stroke of the knife.

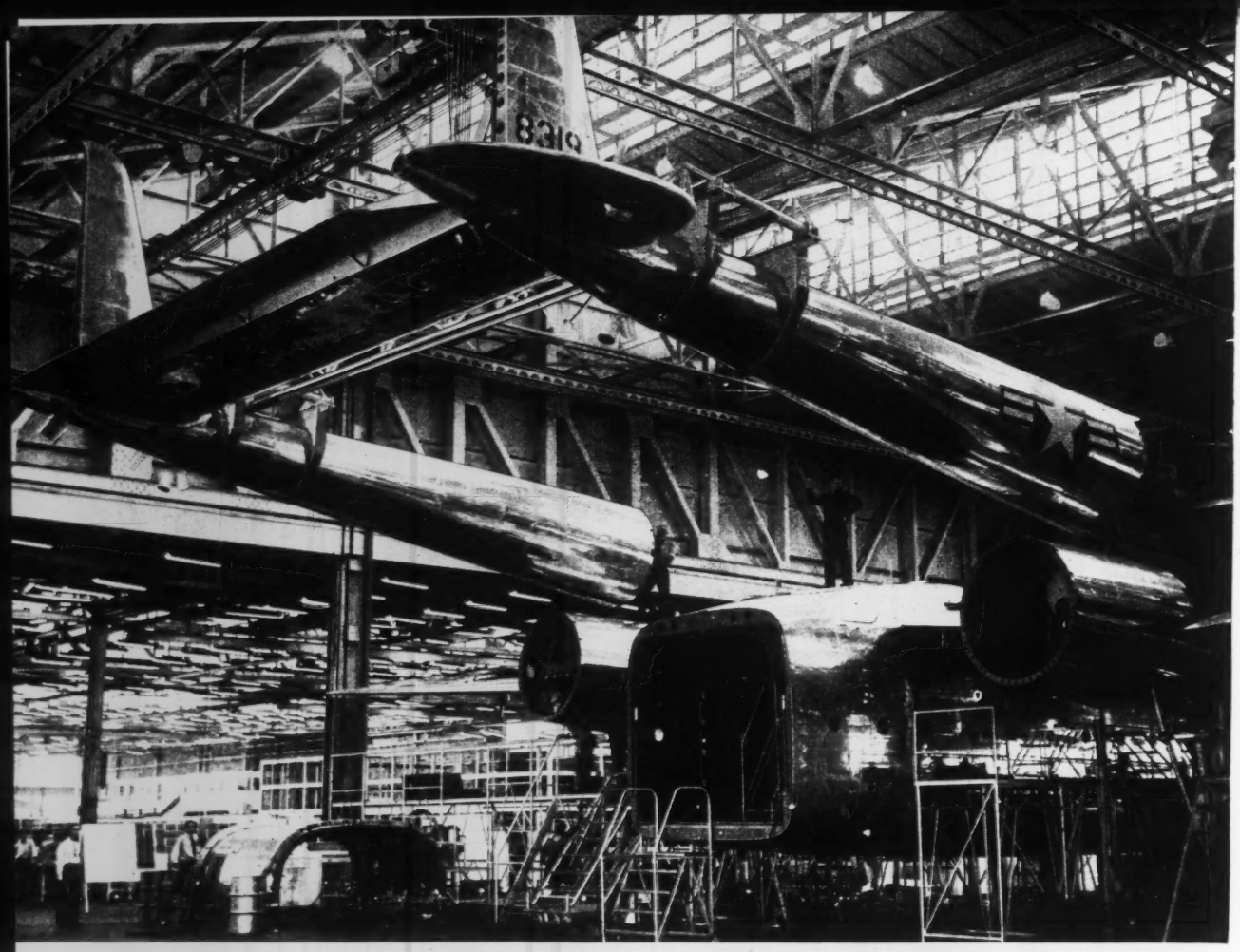
The Harris Shear brings new profits to Scrap Yards

HARRIS FOUNDRY & MACHINE CO.

Hydraulic Engineers Since 1889

CORDELE, GEORGIA

▶ *Talk with a Man from Harris*



20 TON CRANES FLY AIRCRAFT SECTIONS IN CEILING

Lowering the tail boom of a large airplane into place. These huge units must be handled with extreme care and inched gently into exact position for matching of holes. The Cleveland Tramrail cranes used here are of the transfer type and carry loads to 20 tons.

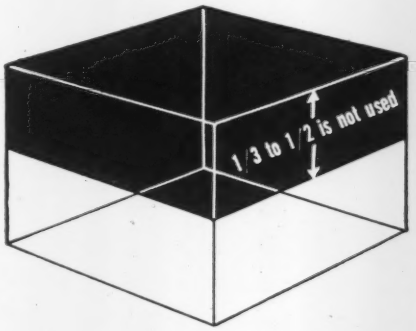
40-FOOT TUBES HANDLED FAST IN CEILING

5 ton Tramrail cab-operated transfer cranes move tubes at 300 f.p.m. to all points in this 58,000 sq. ft. room. To convey the tubes from bay to bay with floor trucks would be awkward, slow and require considerable valuable floor space. The two hoist hooks are 16 feet apart and have a lift of 30'-0".

LOOK TO YOUR CEILING

For Big Savings

1/3 to 1/2 the cubic space in the average plant is NOT USED



MANY plants are pinched for floor space, yet are not using a large part of their cubic footage. Much of their large ceiling space is wasted.

By moving all equipment and activities possible from floor to ceiling, many square feet of floor are freed for the addition of production machinery without plant expansion for needed storage areas and other requirements.

Aisleways can be reduced in size or completely eliminated. Machines can be moved closer together. Floor areas used for local stocking can often be done away with.

Materials handling is an operation that can be carried on efficiently overhead. Cleveland Tramrail equipment is handling vast tonnages of materials in the ceilings of thousands of factories and warehouses. Not only do Tramrail cranes and track systems save tremendous areas of floor space, but they speed handling, lower production costs, often by fantastic amounts, and greatly aid safety.

We welcome an opportunity for a Cleveland Tramrail materials-handling engineer to give you the details.

Write for free Engineering and Application Booklet No. 2008. Packed with valuable information.

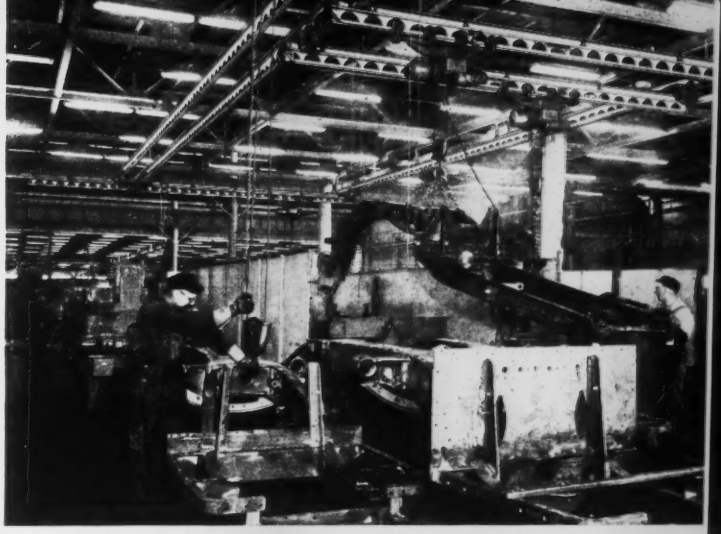
CLEVELAND TRAMRAIL

Overhead Materials Handling Equipment

CLEVELAND TRAMRAIL DIVISION
THE CLEVELAND CRANE & ENGINEERING CO.
7832 East 290th Street, Wickliffe, Ohio

TRAMRAIL CRANES PERMIT LOWER HEIGHT OF CEILING

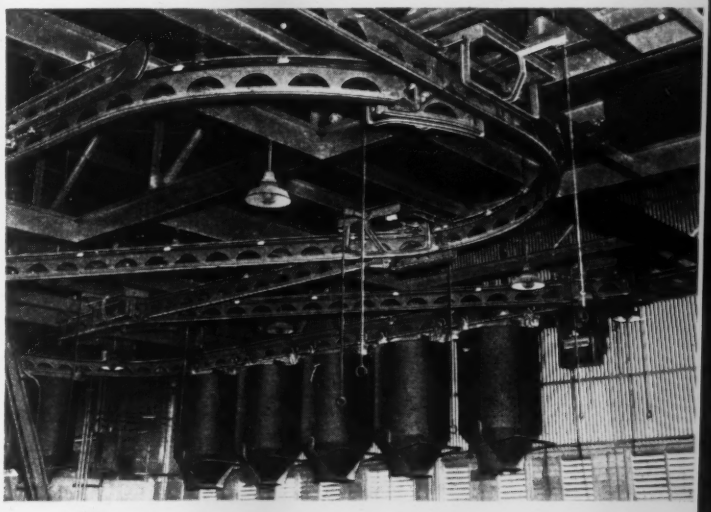
Both ordinary top-running and Tramrail under-running cranes were considered when this Diesel Repair Shop was planned. Two 5 ton, 63'-0" Cleveland Tramrail cranes were installed. Among other advantages, they enabled a lower building height. This shop is thought to be the finest and most modern of its kind.



TRACTOR PLANT PROFITS BY USING CEILING

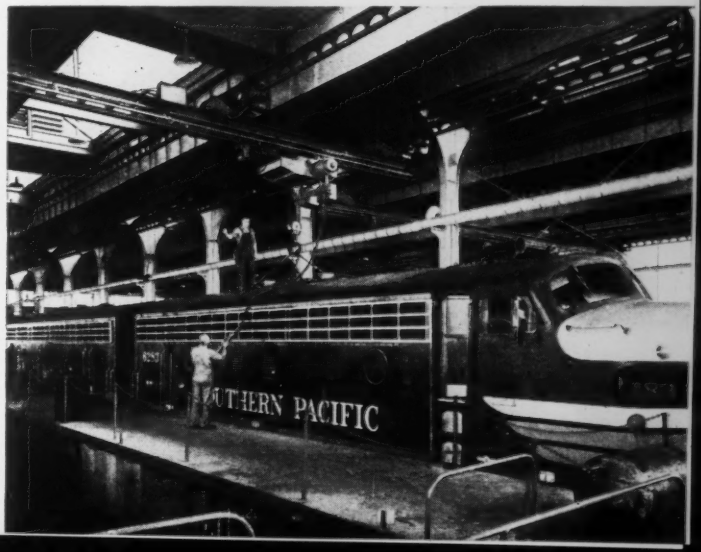
Heavy materials can be moved quickly, easily by one man in every square foot of a plant covered by Cleveland Tramrail cranes.

Some 250 cranes, like those illustrated, eliminate waste time waiting for a lift in this efficient plant.



TRAINS OF BUCKETS CONVEYED IN CEILING

Buckets of materials can be conveyed on Tramrail track and switch system in ceiling by powerful tractor. Control can be automatic if desired. Each bucket in train illustrated has 45 cu. ft. volume and 4000 lb. capacity.



your

guarantee of

quality

drop-forgings

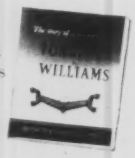
Since 1832, Williams Diamond "W" mark on forgings has meant the best in design, engineering and forging to a high degree of accuracy.

At Williams, there is adequate equipment for complex or simple jobs in short or long runs. Also complete heat treat laboratory and inspection facilities. In addition, forgings can be milled, drilled, turned and broached . . . and there are complete die sinking facilities.

Whether your requirements are carbon, alloy or stainless steel, aluminum, brass, bronze, titanium or monel. Williams can forge them in most shapes and in weights up to 250 lbs.

FREE to Executives Interested in Drop-Forgings

This new brochure tells a detailed story of Forgings by Williams which offer advantages that can't be duplicated. Write for your copy today.



J. H. WILLIAMS & CO.

406 Vulcan Street — Buffalo 7, N. Y.

Look for these Marks of Product Quality

DROP FORGED

Nuclear Equipment Sales Soaring

U. S. industry can look forward to an estimated $4 billion volume of business in equipment and components for reactors over the next decade, says Atomic Industrial Forum

MANUFACTURERS in this country will sell an estimated $4 billion worth of equipment and components for U. S. and foreign nuclear reactors over the next ten years. This forecast is based on the latest survey by the Atomic Industrial Forum Inc., an association whose members are engaged in the peacetime development of atomic energy. The survey also indicates:

The nuclear industry is building toward the installation of more than 500,000 kw of nuclear power station capacity in the U. S. by 1960. By 1968, power reactor capacity is expected to fall somewhere between 2 million and 6 million kw.

Costs—Expenditures for support of civilian power reactor development (on the basis of present commitments) are expected to total $150 million to $180 million annually until 1960-61.

Construction of naval, military, and maritime propulsion reactors is expected to increase at a steady rate during the next decade with the Navy's share amounting to about 90 per cent of the total.

During the last two years, cost estimates have increased sharply. For example, those for pumps, valves, and heat exchangers between 1955 and 1957 increased as much as 115 per cent. However, the report predicts reductions in costs in the 1958-68 period ranging from 15 to 35 per cent.

The composite mean capital cost of the four large nuclear plants scheduled to start operations in 1960 is estimated at $430 per electrical kilowatt, including indirect costs with interest during construction. Cost estimates for similar plants scheduled to start operations in 1968 are estimated from $280 to $360 per kilowatt.

Sales May Double—Annual dollar volume of sales for U. S. large nuclear reactor systems (exclusive of turbogenerator plants and their accessories) is expected to increase from about $300 million in 1960 to a probable range of $350 million to $660 million in 1968. Of these totals, the naval, military, and propulsion group of reactors comprise from 40 to 80 per cent.

In the early 1960s, the estimated annual dollar volume of business in small reactors (rated capacities of less than 25 megawatts electrical equivalent) will rise, equalling or exceeding that of large nuclear powerplants temporarily.

Foreign Market — The foreign area likely to produce the largest concentrated volume of reactor business of interest to U. S. suppliers comprises the six Euratom organization members. Prospective U. S. sales to these countries are estimated to range from $200 million to $380 million, ordered through 1965.

The United Kingdom and continental Europe are expected to require between 4000 and 5000 tons of freshly mined uranium for western power reactors in 1958; 4500 to 8500 tons in the early 1960s, and 7000 to 16,000 tons in the mid-1960s. Comparable U. S. requirements will be a minimum of 1000 to 1500 tons per year for the 1958-68 period; a maximum of about 2000 tons in 1958, 3000 tons in the early 1960s, and 5000 tons in 1965.

Assuming that U. S. fuel fabricators provide between 5 and 20 per cent of the foreign reactor fuel during the 1958-68 period, it is estimated that the combined total annual dollar volume for U. S. fuel manufacturers will be between $20 million and $100 million in the early 1960s; between $30 million and $140 million in the mid-1960s.

The report does not include industrial involvement in the preparation and use of radiation sources, nor in the use of radioactive by-product tracer materials, nor in some of the other important aspects of nuclear research and development.

Expands Nuclear Fuel Unit

Atomic Power Equipment Dept., General Electric Co., San Jose, Calif., completed a $1.5-million addition to its facilities for the manufacture of nuclear fuel elements. The 32,000 sq ft addition makes it pos-

(*Please turn to Page* 108)

NEW TAX CLIMATE

for your new plant

The fact that Pennsylvania manufacturers will save an estimated $45 million in taxes during the current biennium proves our point. To create this "tax climate" favorable to new and expanding industry, the state legislature has taken these steps:

1. Exempted manufacturers from capital stock and franchise tax.
2. Eliminated local *ad valorum* property taxes on machinery and equipment (there is no state-level general property tax).
3. Repealed tax on stock transfers.
4. Made 3% sales tax permanent—now the principal source of state revenues.
5. Reduced the sales tax on purchases by manufacturers.

Add the fact that Pennsylvania has no state personal income tax, and you can see how all this creates a favorable tax climate. Use the coupon below for details.

W E S T P E N N P O W E R

an operating unit of the WEST PENN ELECTRIC SYSTEM

Hello . . .

I'm Charlie Fife. I want to stress the point that this good tax news is only one of many facets that interest manufacturers in expansion in WESTern PENNsylvania.

For example, we have communities offering **100% financing** in attractive lease/purchase agreements; interest as low as 2%, with deferred amortization, can be applied on up to 50% of total plant cost.

Skill surveys and labor inventories in our files show the true picture of **labor availability,** both male and female.

We'll gladly assign a **plant location specialist** to personally assist in your evaluation of WESTern PENNsylvania. There is no charge for this professional service. And, you can be sure that West Penn Power will respect your confidence.

CHARLES M. FIFE, *Manager*
Area Development Department

WESTern PENNsylvania

WEST PENN POWER, Area Development Department, Cabin Hill, Greensburg, Pennsylvania S-1

Yes, I'm interested in WESTern PENNsylvania:

☐ Please send details on taxes. ☐ Please send booklet, "Plant Location Services."

Name _____ Title _____

Company _____ Street _____

City _____ Zone _____ State _____

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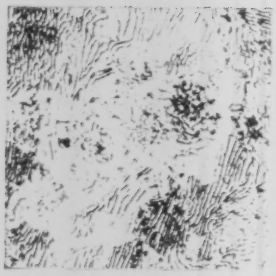
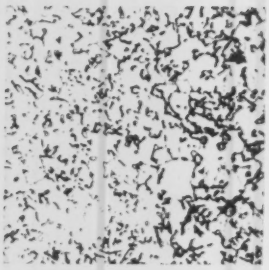
carbon-restored steel meets tightest specs





This steel mill easily meets the steadily tightened specifications of customers who demand stock with good surface finish, no "decarb," and uniform microstructures suitable for cold forming and automatic machining.

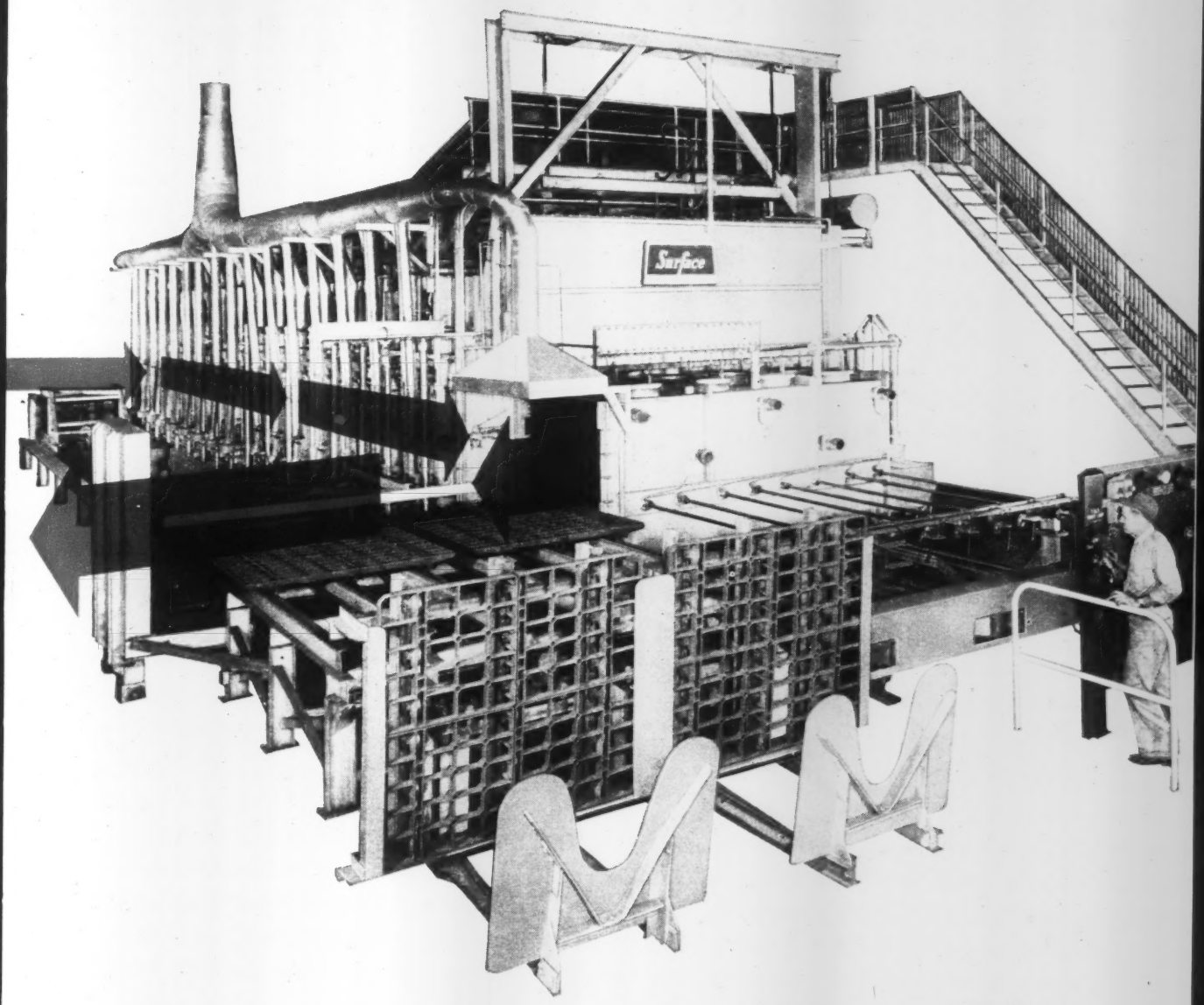
They do it by combining annealing and carbon restoration in a continuous furnace. They get all the flexibility of cycle control they need with 6 zones, individually controlled. An RX® gas generator keeps the carbon potential of the furnace atmosphere in balance with the steels being treated. Automatic dew point recorders provide a continuous check on the atmosphere.

Production rates up to 1,000 tons per month make this furnace a profitable tool.

Again, Surface engineering transforms difficult specifications into profitable opportunities.

Surface Combustion Corporation, 2408 Dorr Street, Toledo 1, Ohio.
In Canada: Surface Industrial Furnaces, Ltd., Toronto, Ontario.

ASSOCIATED COMPANIES: British Furnaces, Ltd., Chesterfield • Stein & Atkinson, Ltd., London • Stein & Roubaix, Paris • S. A. Belge, Stein &



you can meet these specifications:

CYCLE ONE (sub-critical anneal)		CYCLE TWO (over-critical anneal)	
STEEL (AISI)	MAXIMUM-BRINELL	STEEL (AISI)	MAXIMUM-BRINELL
4042	160	4037	151
4140	170	4140	174
5140	166	8127	148
8740	170	8740	174

Cycle One production must show spheroidized structure. Cycle Two must show lamellar pearlite structure. Brinell hardness after annealing.

wherever heat is used in industry

Surface®

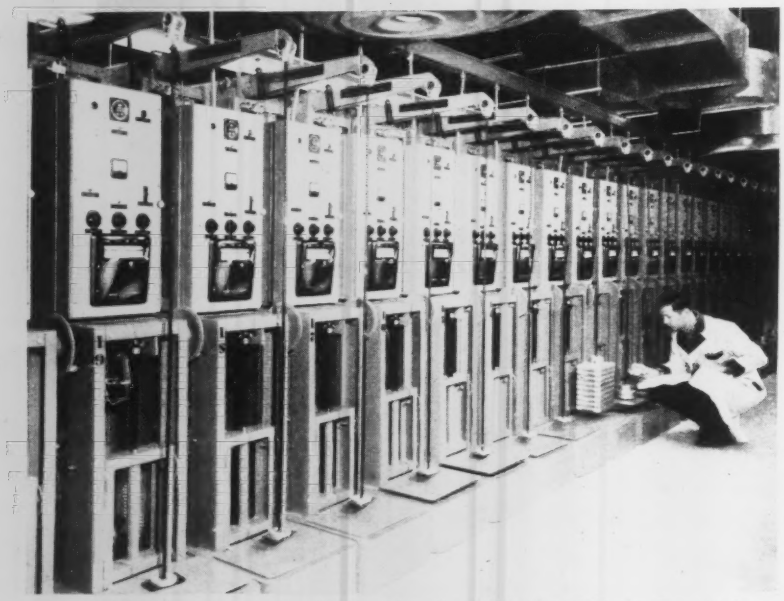
Roubaix, Bressoux, Liege • S. A. Forni Stein, Genoa • Chugai Ro Kogyo Kaisha, Ltd., Osaka • Benno Schilde Maschinenbau, A. G., Bad Hersfeld

THE MARK OF QUALITY

BARBER COLMAN

Wheelco Instruments

Creep-test setup relies on Wheelco for ultra-accurate control



Part of the 30 creep-testing machines equipped with Wheelco 400 Series Capacitrols

Accuracies exceeding ASTM specifications, continued reliability of operation, and considerable savings in initial cost are the benefits realized in the extensive creep-test installation at Joliet Metallurgical Laboratories, Inc., Joliet, Illinois. A total of 30 creep-testing machines — comprising one of the most complete installations of its kind in the nation — are all equipped with Wheelco Series 400 Capacitrols.

Wheelco's plug-in chassis design really pays off here. Maintenance, when required, is fast — there's no loss of valuable data, no need to repeat tests. A chassis change-over can be made in the middle of a test if necessary. Better get acquainted with your nearby Wheelco field engineer for similar benefits.

BARBER-COLMAN COMPANY

Dept. B, 1596 Rock St., Rockford, Illinois, U.S.A.

BARBER-COLMAN of CANADA, Ltd., Dept. V, Toronto and Montreal, Canada

Industrial Instruments • Automatic Controls • Air Distribution Products • Aircraft Controls • Electrical Components • Small Motors • Overdoors and Operators Molded Products • Metal Cutting Tools • Machine Tools • Textile Machinery

(*Concluded from Page 104*)

sible for the department to produce plate and rod-type fuel elements on a commercial basis. It has capacity to turn out 300,000 cylindrical pellets from uranium oxide powder. They will be inserted into metal tubes.

ASSOCIATIONS

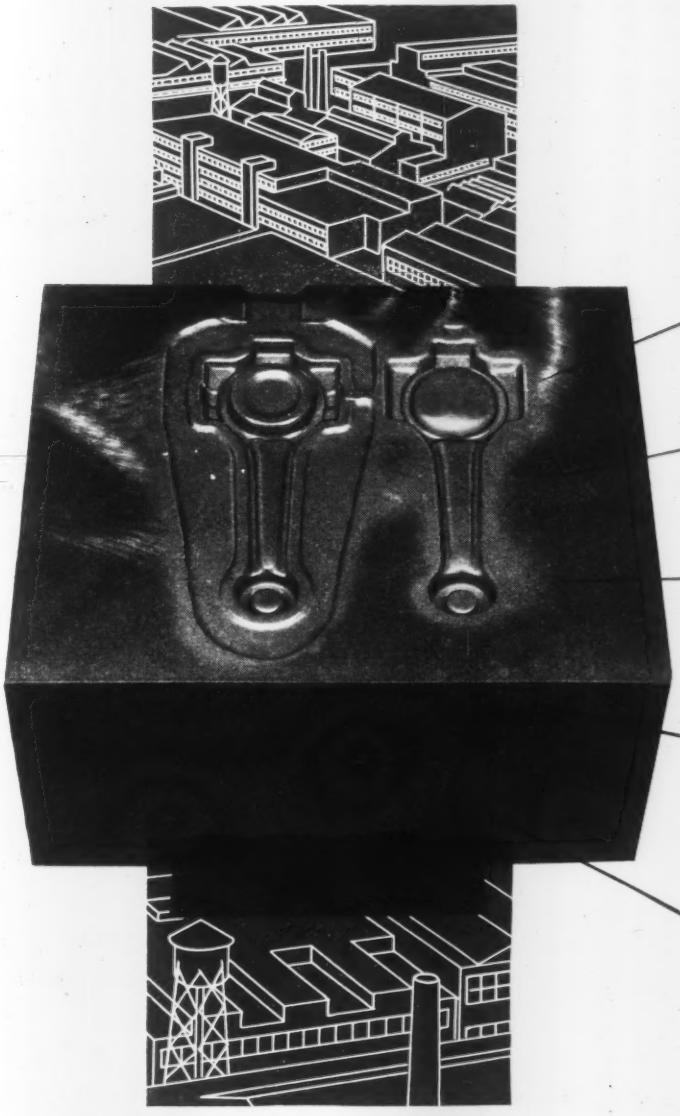
Aluminum Association, New York, elected S. D. Den Uyl, Bohn Aluminum & Brass Corp., Detroit, president. Vice presidents are: F. A. Merliss, United Smelting & Aluminum Co. Inc., New Haven, Conn.; R. B. Caples, Anaconda Aluminum Co., New York; and F. R. Nichols, Nichols Wire & Aluminum Co., Davenport, Iowa. E. G. Fahlman, Permold Co., Medina, Ohio, was re-elected chairman of the board. Chairmen of the five active commodity divisions are: Extruded Products Division, W. E. Dunlap, Aluminum Extrusions Inc., Charlotte, Mich.; Sheet Division, H. D. McKinnon, Sheet Aluminum Corp., Jackson, Mich.; Aluminum Rolled Bar & Rod & Wire Division, E. C. Manix, Nichols Wire & Aluminum Co.; Aluminum Foil Division, J. H. Konigsberg, Revere Copper & Brass Inc., New York; and Aluminum Foundry Division, J. E. Fahlman, Permold Co.

Aluminum Foil Container Manufacturers Association Inc., Pittsburgh, elected these officers: President, R. D. Cleaves, Cochran Continental Container Corp., Louisville; vice president, G. J. Buff Jr., Penny Plate Inc., Haddonfield, N. J.; and secretary-treasurer, S. J. Swensson.

Industrial Heating Equipment Association Inc., Washington, elected these officers: President, C. F. Olmstead, Lee Wilson Engineering Co., Cleveland; vice president, R. L. Harper, Harper Electric Furnace Corp., Buffalo; treasurer, R. E. Whittaker, Swindell-Dressler Corp., Pittsburgh; executive vice president, R. E. Fleming.

Society of Die Casting Engineers Inc., Detroit, elected these officers: President, Harry Cagin, Halex Die Casting Co., Cleveland; vice president, D. L. Rockwell, Clifford-Rock-

...somewhere this forging die is making history!



Both halves of the die were Eloxed in only 50 hours.

Elox equipment used to create the impression costs less than half of conventional tooling equipment.

After washout, Elox equipment will have it back in service in seven hours.

In our Pre-purchase Evaluation division we will demonstrate how Elox can machine the cavities in your closed impression dies at 75% of your present cost. Write or phone today.

10" Connecting Rod Forging
Max. depth impression: 5/8"
Min. depth impression: 1/16"
Tolerances: + or − .003"

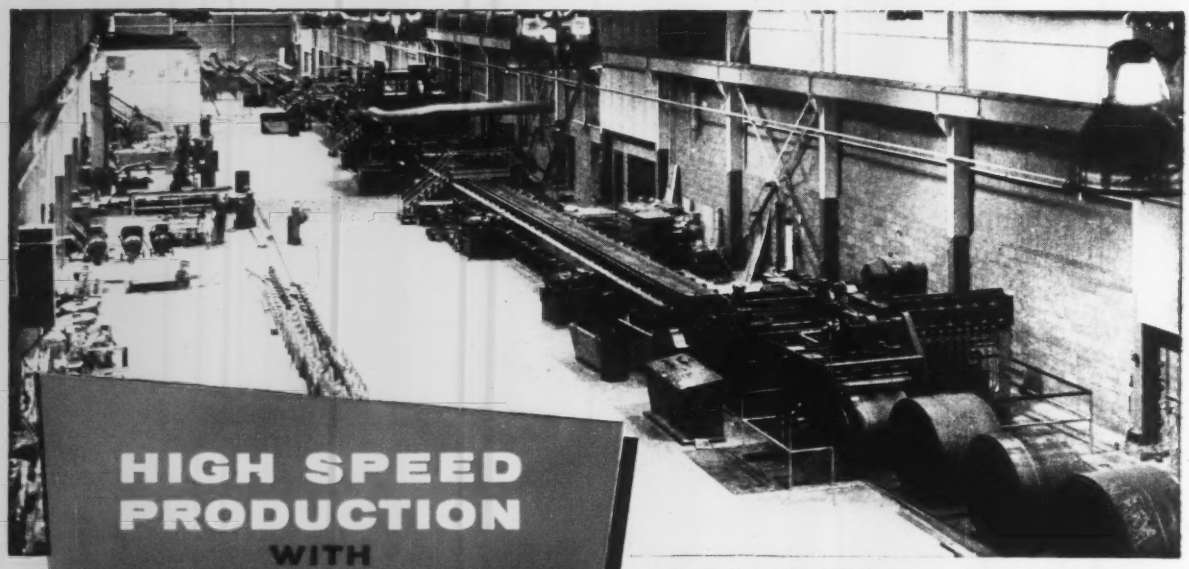
elox* corporation of michigan

* T. M. Reg.

N. Stevenson Highway • Royal Oak 3, Michigan

ELOX keeps you ahead of competition • All forms of Die Making • Form Grinding and Tool Sharpening

For details on how EDM machining of cavity type dies can prove profitable for you, write for Bulletin P7-1257



HIGH SPEED PRODUCTION WITH RELIANCE V★S DRIVES

Six Reliance V★S Drives make it possible to operate this complete line as if it were a single machine.

Carloads of pipe are pouring out of the new Edmonton, Alberta plant of Alberta Phoenix Tube & Pipe, Ltd. This $6.5 million installation is producing pipe at unprecedented rates.

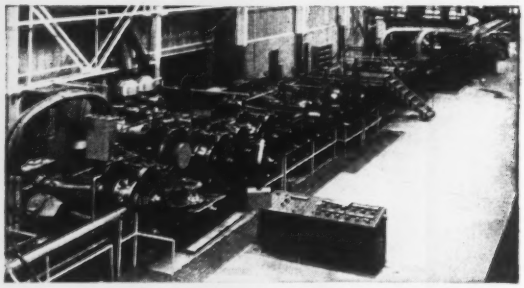
Volume pipe production requires something special in a drive system—one that furnishes precise speed control and instantaneous motor response. A wide stepless range of speeds is provided to handle various pipe diameters and lengths, and all sections of the line operate at the same relative speed.

A team of Reliance Application Engineers, working with the machinery builder, built this specialized drive. This team knows the processes of the steel industry and how to handle the problems involved. Engineering knowledge, backed by the quality of Reliance products, supplied this accurate, simple-to-operate, economical drive.

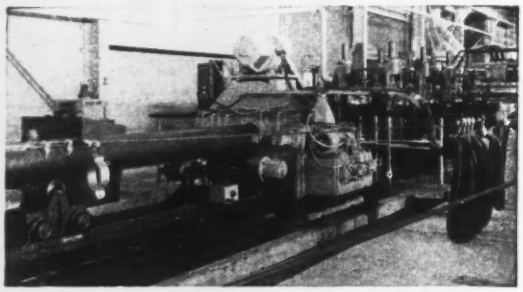
The Reliance Application Engineering Department builds drives for every industry. A team of engineers who are experts on your industry's operation, stand ready to engineer and build the drive for your particular needs.

If you would like more information on this installation, write for Bulletin L-2505.

L-1541



The welding section operator controls the speed of the entire line from this Reliance Pendent Station.



The Reliance V★S Drive on this flying cutoff automatically measures the pipe and controls the movement and speed of the carriage.

RELIANCE ELECTRIC AND ENGINEERING CO.

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Sales Offices and Distributors in Principal Cities

well Co., Detroit; and secretary-treasurer, M. R. Tenenbaum, Lester-Phoenix Inc., Detroit.

CONSOLIDATIONS

H. K. Porter Company Inc., New York, acquired **Kidd Drawn Steel Co.**, Aliquippa, Pa., manufacturer of drill rods and other special cold drawn steel shapes. The Kidd operation will be combined with Porter's Vulcan Crucible Steel Div. W. Scott Bliss, former president of Kidd Drawn Steel, will remain as manager of Kidd products.

Michigan Steel Tube Products Co., Detroit, and its **Miller-Shelby Div.**, Shelby, Ohio, have been merged into the **Standard Tube Co.**, Detroit. The combined organization will be known as Standard Tube Co., with the Michigan Steel Tube Products Div. at 24400 Plymouth Rd., Detroit 39, Mich.

Shareholders of **Universal-Cyclops Steel Corp.**, Bridgeville, Pa., have approved acquisition of **Empire-Reeves Steel Corp.** as a wholly owned subsidiary (STEEL, Dec. 9, 1957, p. 141). "The combined companies will be starting expansion projects involving the expenditure of about $20 million in 1958," says W. G. Stewart, president of Universal-Cyclops. The subsidiary was recently formed by merger of Empire Steel Corp., Mansfield, Ohio, with Reeves Steel & Mfg. Co., Dover, Ohio. Donald W. Frease has been named vice president, Universal-Cyclops. The company is building an $11 million plant at Coshocton, Ohio, which will make cold rolled stainless strip.

Unexcelled Chemical Corp., New York, acquired **Jasco Aluminum Products Corp.**, New Hyde Park, N. Y., maker of aluminum combination windows and doors. Jasco will be operated as a division.

Victor Equipment Co., San Francisco, manufacturer of gas welding and cutting equipment acquired six liquid and compression gas producing firms, all owned by the Coyne family. The firms are: **California Oxygen Co., California Liquid Oxygen Co.**, and **California Medical Oxygen Co.**, Sacramento, Calif.; **California Oxygen Co.**, Salinas, Calif.; **California Oxygen Co.**, Los Angeles; and **California Oxygen Co.**, San Diego, Calif.

Wehr Steel Co., steel foundry, purchased **Dings Magnetic Separator Co.** Both are in West Milwaukee, Wis. Wehr is the surviving corporation with Dings operating as a division.

American Air Filter Co. Inc., Louisville, acquired **Kennard Corp.**, St. Louis, maker of heating and cooling coils, and heating, ventilating, and cooling units.

NEW PLANTS

S. Smith & Sons (Canada) has occupied its 13,000 sq ft plant in the Don Mills industrial area of Toronto, Ont. It is equipped to manufacture flexible tubing and conduit and to service and overhaul precision aircraft and electronic instruments and automotive accessories.

Hoover Tool & Die Co. has formally opened its plant at 5775 E. Ten Mile Rd., Centerline, Mich.

A 380,000 sq ft metal container plant has been completed at Sharonville, Ohio, for **Continental Can Co.**, New York. The plant was built and all manufacturing equipment installed by Wigton-Abbott Corp., Plainfield, N. J.

NEW ADDRESSES

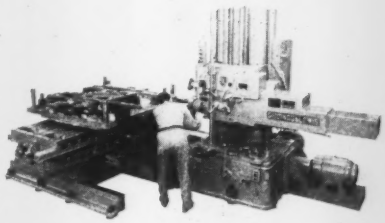
LeCount Tool Works Inc. moved into its new plant at 38 Cody St., West Hartford, Conn. The company makes mandrels.

E. C. Smith Mfg. Co., maker of thermocouple wires and accessories, moved its operations from Philadelphia to larger quarters at Forrest and Hector Streets, Conshohocken, Pa.

Fairchild Engine Div., Fairchild Engine & Airplane Corp., Hagerstown, Md., moved its Purchasing Dept. to Comac Road, Deer Park, N. Y.

TENNESSEE — South's Largest Concentration of TOOL and DIE SHOPS for Metal Working Industries

These excellent tool and die facilities make Tennessee an advantageous location for branch plants. Ranging from medium size to firms employing 40 to 100 men, many of these shops can take care of virtually any assignment from building special machines to complete tooling programs including tools, dies, jigs and fixtures, and are handling important projects for large national manufacturers. If you are considering a branch plant in the South, write confidentially for complete information.



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Please send details on Tennessee's tool and die industry and other industrial advantages.

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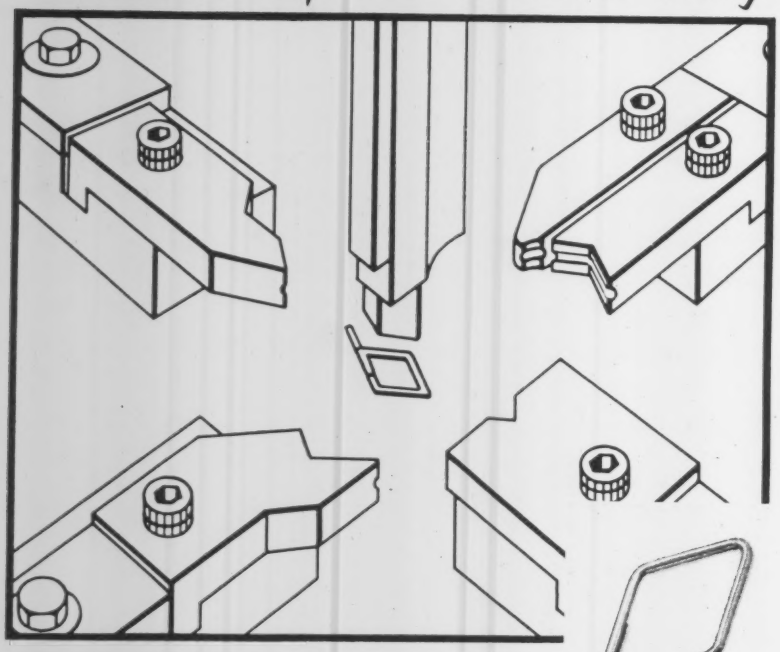

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Whether your product is formed simply . . . or requires complex bending in several planes . . . a Nilson 4-Slide may be the solution to your production problems.

The sketch above shows the tooling used by a leading manufacturer to mass-produce metal hooks—at the rate of 280 pieces per minute! A Nilson 4-Slide has proved to be the most efficient, economical way to manufacture this product . . . and many other kinds of wire forms and small metal stampings.

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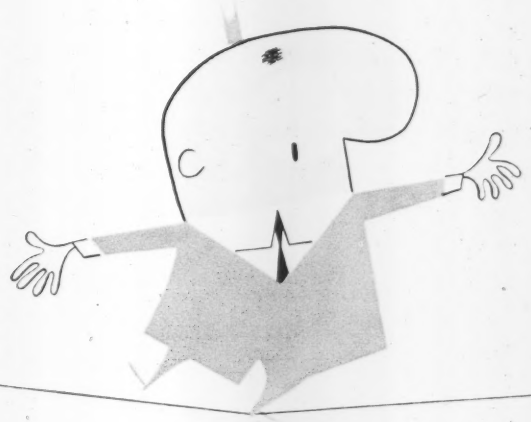
Production Control for Profits

On Mar. 17, STEEL will publish an article showing how those responsible for production flow can boost efficiency. It will be the second in this publication's ten-part Program for Management in 1958.

Next month's story will answer two major questions: What are the elements of a good production flow program? How do you set it up and make it work continuously?

To answer the first, the characteristics of all good programs will be described. Variables will be pointed out and tips given on how to allow for them. To answer the second, ideas will be presented on how to police the product flow, how to expedite, and how to balance product mix.

An extra copy of these Program for Management articles is available until the supply is exhausted. Write Editorial Service, STEEL, Penton Bldg., Cleveland 13, Ohio.



Balance Your Management

SCARCITY of good management talent is the one postwar shortage that industry hasn't licked.

The evidence: Management consulting firms are busier than ever before; executive recruiters can't keep pace with demand; organizations specializing in executive training are experiencing record enrollments (last year more than 85,000 participated in American Management Association's activities alone).

Lawrence A. Appley, AMA's president, sounds a warning (see Page 115) to those firms which haven't given management development the attention they've showered on such things as sales, expansion, and unit cost reduction. He believes postwar management development programs are beginning to pay off. Standards of management performance are going to be higher in the 1960s—a factor which in itself will stimulate business in the predicted "new boom."

Start Your Measurement Here

How will your company measure up in the "golden years for management" that Mr. Appley speaks of? To find out, ask yourself:

1. What's the average age of your top management? If it's 60 or higher, the answer to the next check should be a loud yes.

2. Do you have qualified successors (names, not generalizations) for each top spot? How far down the ladder can you pinpoint succession?

3. Are executive responsibilities correctly distributed for proper emphasis on all company activities? (Example: A sales manager in a small firm may be able to wear three hats, but he'll have to hang one or two up as the company grows.)

A good place to begin your measurement is with the organizational chart and an inventory of management personnel.

It took an executive's heart attack to jolt one Chicago metal-

working firm into the realization that six of its seven top management men would be retiring within five years under a compulsory retirement policy. A check of the middle and upper middle management roster pointed up a situation many firms face: The middle and upper middle management ranks are the weakest link in the management chain today. Reasons: The depression cut down the number entering management ranks; World War II curtailed development programs.

Cadillac Div., General Motors Corp., has started developing its "manpower planning" program. As individuals enter the supervisory and management ranks, their backgrounds and results of psychological tests are recorded and keyed by an IBM system to specific job areas. When a vacancy occurs, all cards of individuals immediately qualified for the position are available. Also immediately available is information on those who have potential for the position but need some specific experience or training to make them immediately qualified.

Cadillac forecasts its manpower needs three to five years ahead and annually checks its inventory of who's available and what needs to be done to prepare those with potential for future openings.

How much depth behind each position should you have? This comment by W. S. Chisholm, director of personnel at Cadillac, is typical of firms who give more than lip service to management development: "We always have one, generally two, and sometimes three individuals immediately qualified to step into any one spot."

If you've never made a formal appraisal of your management personnel, you may need the help of a consultant to obtain an objective check. At its extreme, says Harry Clayton, executive vice president of John A. Patton Management Engineers Inc., a complete inventory might include: A survey of attitudes of subordinates as well as superiors toward the individual manager, a performance review, psychological and aptitude tests, and personal interviews by the consultant.

The importance of a personnel inventory—however achieved—and a forecast of future management requirements can't be overemphasized. They are directly related to company objectives and are the foundation for tailoring management development programs to achieve balance in management.

Management development is two-pronged: The training phase to increase the individual's basic knowledge, the development phase to strengthen his administrative skills. Behind most programs which fail is the lack of proper emphasis on the latter—and this shortcoming can generally be traced to a lack

These Companies Lacked Balance

A. The 70-year-old founder of a thriving metalworking firm, employing 2000, sought the aid of a management consultant. He wanted an executive to step into his shoes. "I've always believed in management continuity, but every man who has ever been qualified has left for other opportunities," he complained. The consultant discovered that the founder was an "authoritarian," unwilling to delegate responsibility. Capable men became frustrated and left. Only the Casper Milquetoasts remained.

'Golden Years' Ahead, Says AMA's Appley...

"The 1960s will be the golden years for management. That's when the dividends will begin to appear on the millions spent for management development since the end of World War II. I feel that starting at the end of 1958 and into 1960 we will see a great resurgence of business—due in large measure to the increased competence of our nation's executives."

The prediction is made by Lawrence A. Appley, president of the American Management Association, and "Mr. Management Development" to the thousands of executives who have taken part in AMA activities.

Mr. Appley also sounds a warning: "Organized management development is not practiced by the majority of companies today. But the idea is spreading fast. This should serve to warn those firms which do not have development programs. Get started now to insure yourself of managers who can compete in the 1960s—the standards of management will become increasingly higher than they are today."

There is no "one best" management development program, emphasizes Mr. Appley. Each must be tailored to fit the needs of the company. But all programs have certain things in common:

1. An adequate personnel forecast to determine future management needs.
2. Clear-cut objectives, with the method of selecting and developing managers formally spelled out.
3. Coverage of all facets of management activity.
4. Clear-cut responsibility and authority for the administration of the program.
5. A definite understanding that management time, effort, and money will be required to assure success.

of top management support of management development.

First: Book Learnin'

Take a look at the basic outline of Harris-Intertype Corp.'s characteristic training program.

1. Basic courses which include executive development, administrative techniques, sales techniques, foremanship, machine tool operation, blueprint and machine shop math (the latter open only to non-supervisory employees).
2. Applied courses including erection and service of equipment, and graphic arts equipment and processes.
3. General courses which include: Internal group meetings, such as management dinners, sales and service gatherings; committee and general information affairs; semi-

in Management...

B. The vice president of a multidivision firm died in his midforties. It was a double blow to the company:

1. The vice president was being groomed to succeed the 66-year-old president.
2. No manager was immediately qualified for the vice president's position. High caliber young men were on their way up, but they weren't ready because the firm's management development program was only three years old.

C. This firm did a flourishing business with its limited lines. Its two major products were protected by patents, but when they expired, competition moved in. Sales and profits skidded. An activity analysis of top executive duties indicated that new product development was really the combined responsibility of sales and manufacturing. But neither executive spent a great deal of time on it. The consultant recommended: Set up a separate research and development program, hire an outsider to head it up.

nars and meetings of technical and professional organizations; attendance at colleges or night schools.

The internal courses generally are taught by department heads, explains Loren Miller, assistant to the president at Harris-Intertype. The executive development course is conducted by George S. Dively, president, in eight 2-hour sessions. "In training," points out William M. Hughey, director of personnel, "individual coaching and realistic appraisals are probably the most effective techniques."

Where large numbers of personnel are involved in training programs, you may have to divide them into segments similar to Convair Div., General Dynamics Corp. Its program has three: Supervisory, engineering management, and executive. Says M. G. Burland, assistant to the vice president-administration: "The same general coverage is given to both supervisory and engineering management but, by having separate programs, we can tailor them to fit the needs of each group. Our executive program is for upper management levels where individual needs for development can be considered because of the relatively small size of the group."

Development Takes Practice

The hard core of management development is the *development* activity. A frequent complaint of the ambitious individual in the lower echelon: "I've taken all their training courses; I attend an occasional outside session. But when do I get the opportunity to practice what I've learned?" An equally frequent response: "Bide your time. We can have just so many chiefs—there must be Indians too."

Many times such an answer may be justified, but more and more firms are beginning to recognize the need to provide added emphasis on the development phase. The reasons: To cut down the turnover of men with good potential and to increase an individual's chances for success when he does break into the management ranks.

Take a look at the major reasons individual managers fail; they illustrate the need for *development* as well as *training*:

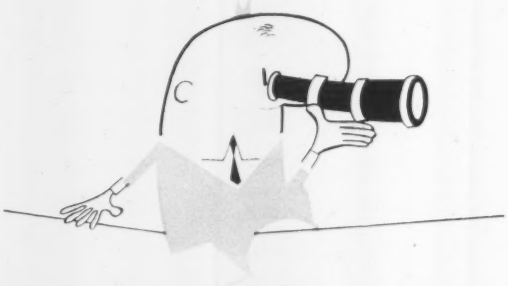
1. Inability to delegate.
2. Lack of sufficient broad knowledge.
3. Inability to analyze and evaluate problems and solutions.
4. Inability to judge people.
5. Inability to co-operate with others.
6. Inability to make decisions.
7. Lack of skill in personal organization and administration.

Charting the Development

Here are the major activities companies are stressing to meet the development need of their management nurturing programs: Job rotation, special project assignments, multiple or committee management, encouragement to participate in outside activities. None of these is new.

Let's examine job rotation. Most firms can single out examples of executives who have moved about the company in their climb up the management ladder. Most rotation, however, has been incidental to meet specific management needs. Formal or planned rotation is not widely practiced. It has two basic approaches: 1. To broaden the individual. 2. To overcome some specific weakness or shortcoming.

At its Indiana Harbor Works, Inland Steel Co. has a well developed rotation program. To achieve a specific position, a manager is expected to have a minimum of experience in certain areas. Thus, an assistant superintendent of the me-



Spot That Potential Manager . . .

1. He's constantly alert to opportunities—but not only those that will advance his own cause. He also looks for better ways to do his job.
2. He's sensitive to detail—but doesn't get lost in minutiae. He recognizes the whole is made up of small parts, each of which must be right.
3. He's reliable—given a job, he'll follow it through to completion. Faced with a problem, he'll know when to ask for help rather than fumble blindly for a solution.
4. He's conscious of human values—he never accepts any individual at face value, always insists he can make a better man out of anybody.
5. He's organized and orderly—in his thinking and action.

chanical department must complete a minimum of six months' experience in these departments: Blast furnace, coke plant, open hearth, shape products, flat products, general shops. There may be rotation within each department also.

Department heads annually review various management individuals. "This is done," says Bennett Kline, director of management development and training, "to determine depth behind management positions—we designate first, second, and third choices—and to appraise the individual on his progress and where he needs experience and training."

Planned rotation is not always easily achieved. One of the key factors involved is management climate—if you have insecurity or considerable unrest, you will face some special problems. "But when the proper climate is established," Mr. Kline points out, "rotation can be more easily accomplished—particularly where lateral moves with no promotion or salary adjustment are involved. Inland management people accept lateral moves and rotation for what they are—development of the individual. Another must in rotation, we feel, is that the individual must master his specialization before moving on to something else."

One of planned rotation's virtues is that it helps prevent overexposure of an individual to a narrow job. Engineers and accountants tend to be preoccupied with materials and numbers to the extent that they lose perspective of the importance of people, policy, and organization. Staff personnel with emphasis on reference and counseling often get too little practice in actual execution of an independent program. Salesmen tend to be always in action rather than taking time for reflection.

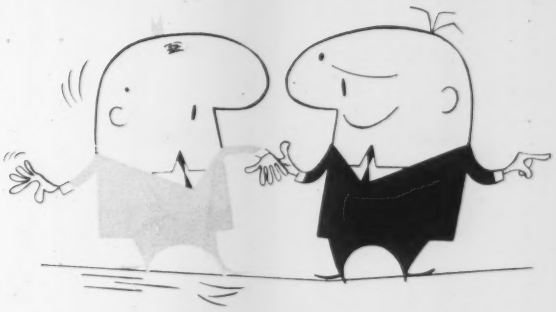
Another virtue is the building of good line-staff relationships that are necessary to balance in management. One firm reports that a manager it was grooming to head up a division was glaringly weak in labor relations. Training courses did little to improve the individual; he apparently was not trying to understand the problems involved. The firm transferred him to industrial relations for 18 months, then sent him back with a promotion to assistant division manager. The stint with the labor problems improved the individual's understanding of that activity and helped his general relationships with all staff managers.

Special project assignment is getting more attention from companies, too, as a method of developing individuals. Convair uses the technique frequently. In the early stages of the B-58 development, the Fort Worth Div. moved 12 individuals from regular assignments into special projects connected with the aircraft. At the same time, the understudies to these individuals were given the opportunity to assume full responsibilities of their former superiors. Some companies use the special project assignment as a final test of an individual before promotion.

Multiple management and variations of committee management are other ways of building potential managers. Bringing more people into the management act helps create a better development climate and increases the amount of brain power applied to problems and their solutions.

H. Y. Bassett, president of Calumet & Hecla Inc., (see exhibit, Page 118) readily admits that its multiple management started for one reason: Top management failed to recognize that middle management was part of the "team." Today, foremen know they're members of the management team—they are responsible for decisions in their own areas; they're gaining the "big picture" of the company by participating in committees dealing with problems outside their own bailiwicks.

Rockwell Mfg. Co. uses another



Why Turn to the Executive Recruiter?

1. To fill a new position.
2. To pump "new blood" into management ranks.
3. To hurdle "political ties."
4. To obtain a new source of ideas.
5. To take advantage of his wide connections (which may extend to other industries) in your search for talent.
6. To gain the benefits of bringing in a third party. The recruiter's recommendation is often more readily acceptable to all concerned.

Gain Balance Through Multiple Management

H. Y. Bassett, president, Calumet & Hecla Inc., outlines the philosophy of his firm's program this way: We feel each supervisor and executive can do a more effective job if he seeks the counsel of the people directly under him. They do the work; they are the people to whom the supervisor has delegated responsibility.

Each member of the top management committee is the chairman of his own advisory committee in the next lower management echelon. The plan extends to assistant foremen at the division level who head committees made up of their hourly rated group leaders.

Committees discuss their own problems. No matter what they involve—quality control, financial, personnel—each member is given an opportunity to express his opinion. The objectives are to gain information, promote understanding, and generate problem-solving ideas. There is no compulsion to arrive at unanimous agreement.

Final decisions are the responsibility of the chairman.

variation of the committee technique. On most of its committees, even top level budget and management planning committees, there are two or three seats purposely kept open for rotation of managers. Basic purpose, says W. F. Rockwell Jr., president, is to give the individual a broader view of the company activities as well as to solicit his constructive ideas. Some committees have more than one level to permit wider participation. The product planning committee, for example, has two levels—each with spots for rotating men in training.

Most progressive companies encourage their managers and potential managers to participate in outside professional, technical, and civic organizations. Too often, however, this participation amounts to mere attendance, primarily because the individual does not have time. Make sure that you provide the *time* as well as the encouragement for the individual to get the most from the extracurricular endeavors.

The Basic Test of Balance

Balance in management has only one real test: How effectively do your managers function together? Interrelated in any attempt to measure this are: 1. A method of determining whether your organizational structure is sound. 2. A method of evaluating and judging executive performance.

Two factors tend to force your organizational structure out of balance: 1. Growth. As you grow it becomes necessary to divide the increasing workload into manageable units of responsibility and authority. 2. Technological change. All management positions demand combined technical and administrative talents. Our rapid technological advancements are making executive jobs more complex than ever before.

It's difficult to ferret out weaknesses in organizational structure. For example, failure to achieve a sales goal doesn't necessarily reflect a shortcoming in sales management. Other activities may share in the problem—or even be solely responsible—such as design, market research, quality control, pricing.

One approach in determining whether the workload is properly distributed is to bring your job descriptions and job evaluations up to date. Unless people know what their duties are and what the relations of their activities are to others, work can become confusing and performance suffers. A change in the business climate may necessitate additional emphasis temporarily on one function. Currently there's a noticeable strengthening of the marketing activity to cope with the problem of excess production capacity and a decline in consumer demand.

As with the personnel inventory, if you've never written job descriptions, it's best to call in a consultant. Of necessity, job descriptions at the management level are fairly detailed and long. Typical factors included: Function or objective of the position, organizational relationships, scope of authority, duties, and responsibilities. "One of the big weaknesses of many job descriptions," says Arch Patton, consultant with McKinsey & Co. Inc., Chicago, "is that final decision authority is seldom pinpointed."

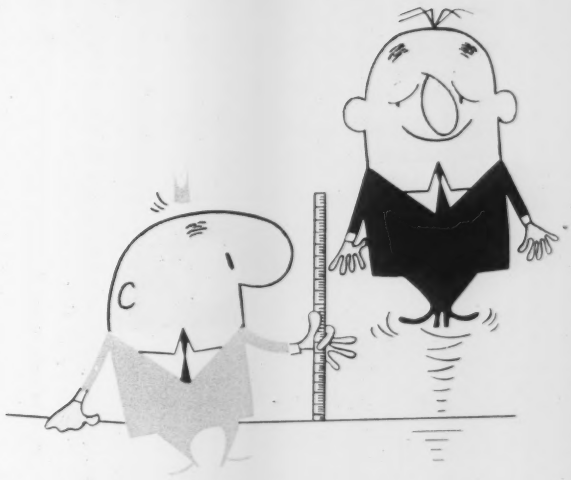
Yardstick for Performance

Job descriptions do but half of the job, many executives feel. A further yardstick is needed to appraise individual performance. This is repeatedly brought home at the American Management Association's Presidents' Round Table conferences. In these off-the-record sessions, in which presidents discuss mutual problems, two of the major interest areas are: 1. How can a president judge the performance of his top executives? 2. How can he keep pace with what's going on in his company?

Some companies like Harris-Intertype and Calumet & Hecla are attacking the problem by extending job descriptions to include standards or measures of performance (see method used by Harris-Intertype, at right).

Such written standards should be supplemented with a periodic appraisal of individuals. These appraisals are conducted by the individual's immediate superior and two or three higher echelon executives with whom the individual has contact. Appraisal factors include: The individual's leadership and human relations ability in dealing with others, his management and administrative ability in attacking problems and carrying out his responsibilities, his technical performance in relation to company policies, his specific job and field. These are appraised in relation to the written standards of performance.

Do you tell the individual the results of the appraisal? You'll find emphatic answers on both sides of the fence. At both Harris-Intertype and Calumet & Hecla, counseling sessions with the individual are



A Yardstick for Executive Performance . . .

Profitability —measured by effectiveness of administration in terms of long and short term company and corporation objectives.

Sales volume —measured by proportion of industry's business, general economic conditions, customer relations.

Product development—measured by position in industry, customer acceptance, progress in new and improved products.

Personnel —measured by general employee reactions and status of employment needs in relation to supply.

Organization —measured by effectiveness, morale, and timeliness in terms of short and long term objectives. Includes planning, staffing, and training in engineering, sales, and manufacturing.

Judgment —measured by quality and consistency of administrative decisions and actions.

New Ideas —measured by applicability, value, timeliness.

Followthrough—measured by timely completion and quality of work.

Leadership—measured by professional management standards in terms of knowledge, habits, and attitudes.

Source: Performance measurement of president's position at Harris-Seybold Co., division of Harris-Intertype Corp.

Average Age of Metalworking's Executives . . .

	1947	1957
Chairman	64	63
President	58	55
Vice President	51	56
All Corporate Officers	54	55

Source: Survey by Heidrick & Struggles, Chicago.

conducted—generally by the individual's immediate supervisor. Key to whether you counsel the individual, says C&H's President Bassett, is your management climate. It must be accepted that the basic purpose of the counseling is to help the individual improve his effectiveness in his present job and to help him develop his capacities for growth.

Establishing effective standards of performance is difficult. In practice, most tend to be guideposts rather than specific benchmarks. In many positions—mostly line—it is possible to set up cost and profit type measurements and these are generally self-evident.

Setting standards for staff positions, however, often requires analysis over a longer period. Industrial relations, for example, can be measured or evaluated by such factors as employee turnover, labor relations, strike record, comparable wage and benefit rates, and meeting replacement needs from within.

Two things to keep in mind when attempting to set up standards for appraising individuals:

1. Relative opportunity the particular position offers. When comparing sales of different divisions, such factors as territory potential must be considered—Market A may be an expanding area, Market B a declining one.

2. Strip away all factors over which the individual has no control when setting his standards. This is difficult, but an individual should be appraised only on those factors for which he is solely responsible.

Crash Program for Balance

Yet, what if there's no time to work out a well-nurtured management development program? Says an executive of a California firm: "We've got a key post to fill and no one qualified for it. We need to fill it now. How do I find the best possible man outside?"

AMA's Lawrence Appley suggests these guideposts:

1. Go over the situation with your management team to be sure they understand the situation and agree that no one in the company is able to fill the post.

2. Realize this: Most outsiders you look at should be discounted by 30 or 40 per cent when you're comparing them with your own managers. Most outsiders always look better than they really are; similarly, the internal man you're passing up probably looks good to someone else who doesn't know him as you do.

3. Ask your management team to suggest executives they know as the result of business and social contacts.

4. Employ executive recruiters or consultants to conduct a search for you.

The controversy over the value of the modern executive recruiter still boils among many executives. If he has found an able top manager for one, the recruiter is an asset to the business community. If he has hired a top man away, the recruiter is a pirate and a disturbing influence.

This much is certain: The shortage of good top managers will continue, probably get more severe in the 1960s. Your best protection is well-balanced management with good depth behind each position. If you get into trouble, don't overlook the real advantages of seeking executives through a recruiter or consultant (see checklist, Page 117). They're the most valuable in searching for managers in the upper middle and top levels. Fees for these services vary from 20 per cent of the executive's first year salary to a flat finder's fee. Experience indicates that better than 80 per cent of their executive placements prove successful.

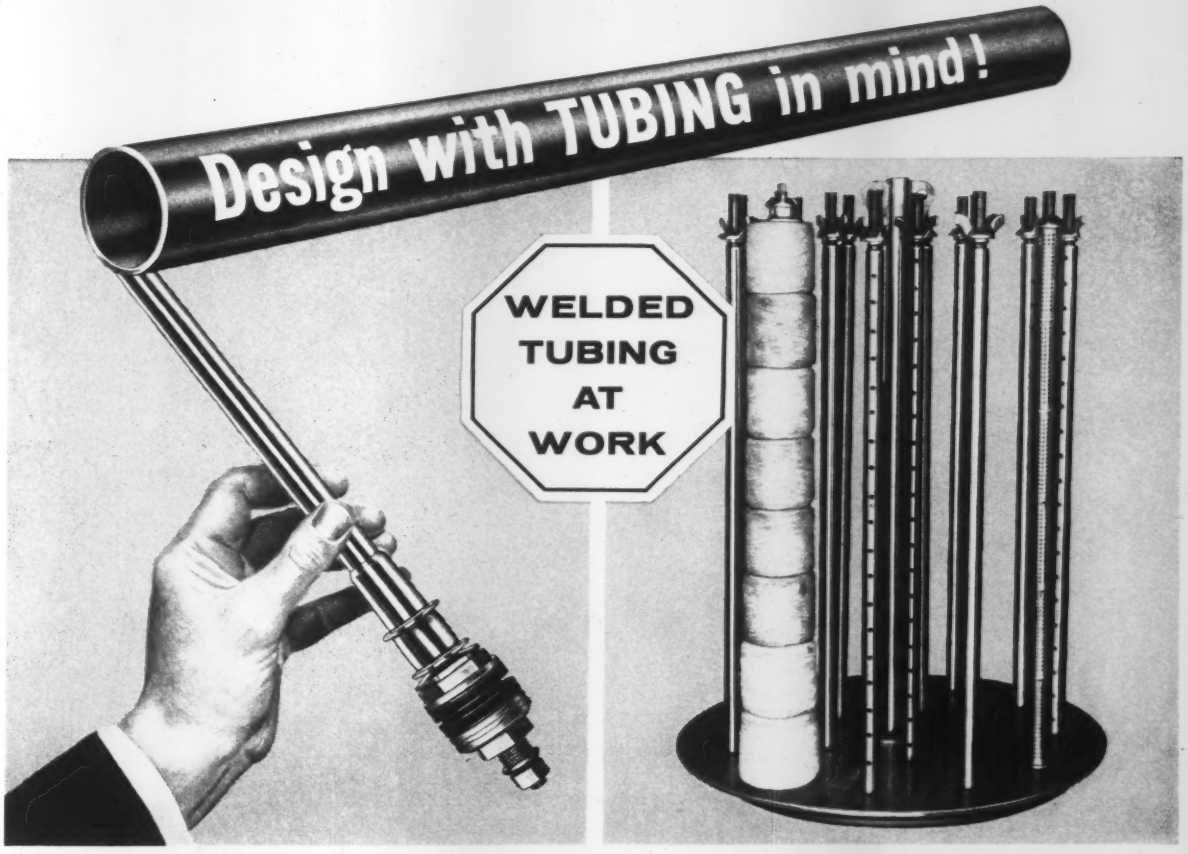
The Final Test

Management is basically the development of people—not the direction of things. So any attempt at evaluating balance in management must be done in terms of people, your managers.

Here's one test: Faced with the problem of starting a new division in your company, could you staff a competent management team for that division from your current management ranks without weakening the parent firm?

Convair's San Diego Div. did. When Convair established the Convair-Astronautics Div., 47 of the 58 executives of the new unit came from the San Diego Div. All vacancies at San Diego were filled from lower ranks—that took balance in management to accomplish.

Many executives believe: If businesses are not growing, then somewhere along the line — probably near the top—management is failing. That's opinion, but statistics show 90 per cent of all business failures can be traced to inadequate, unbalanced management. How's your balance?



This spindle turns at 10,000 RPM without a jitter—that's the benefit of Welded Carbon Steel Tubing's "on-center" uniformity of roundness, wall thickness and concentricity.

Corrosion Resistant Welded Stainless Steel Tubing withstands constant contact with chemical dyes, pressure and wear in this packaging yarn dyeing equipment.

For 10,000 RPM's or fighting corrosion

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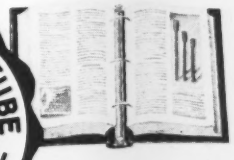
An Association of Quality Tube Producers

FORMED STEEL TUBE INSTITUTE — FSTI



Design inspiration for you

The 260-page Handbook of Welded Steel Tubing contains inspiration and data for tubing designs. For your copy, write on your company letterhead, giving your title.

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Technical Outlook

TITANIUM SCORES AGAIN— By using commercially pure titanium for rack tips in anodizing aluminum auto parts, Reynolds Metals Co., Louisville, has increased their life from 6 to 120 days. The corrosive element in the process is a brightener, a solution of concentrated sulfuric and phosphoric acid. The basic racks are made of rubber-coated aluminum; the titanium tips are riveted or bolted into place. The company is considering the use of titanium for spline and stamped metal finger types of racks. Mallory-Sharon Metals Corp. is supplying the titanium.

BUILT ON BOARD—The biggest motor-generator set ever shipped by Reliance Electric & Engineering Co., Cleveland, was built right on the flatcar. It proved cheaper to tie up the shipping dock than to handle the 37 ft unit on the erection floor. The set, consisting of a 1500-hp motor and four generators in line, has just been shipped to the Gary Works of U. S. Steel Corp.

CHEAP CASTLE NUT—Front wheels on 1958 Chrysler Corp. cars are held on by a simple hex nut. A sheet metal nut cover with a castellated collar engages a cotter pin in the same manner as the former—and expensive—castle nut.

NEW IN HEAT EXCHANGERS— A new impervious graphite tube with internal fins more than doubles the inner surface area, says National Carbon Co., division of Union Carbide Corp., New York. The tube has 23 fins, each 3/16 in. high, that twist helically to provide turbulent flow and increase heat transfer properties. The tubes are designed for use in corrosive services where the internal heat transfer coefficient is low and limiting.

FOAMED METAL CORES—Low density metallic foams for sandwich construction have been produced from an alloy containing 95 per cent aluminum and 5 per cent magnesium, using 2 per cent zirconium hydroxide as the foaming agent. Density was 15 psf, nominal cell size about 1/16 in. To make the foam, the eutectic alloy was melted, the foaming agent stirred in, hydrogen released from the hydride, and the foamed metal solidified. Quality of the foam was improved by introducing air or oxygen into the mixture before its solidification.

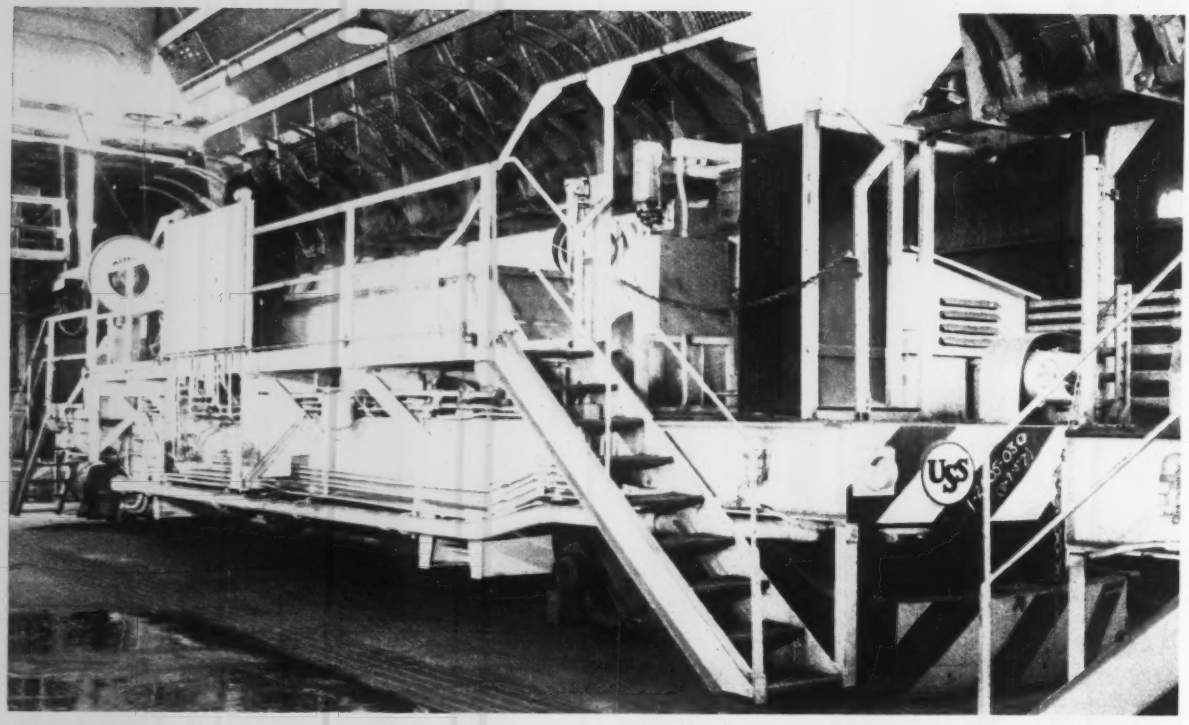
PUMPS FOR CORROSIVES— If the pumps you are using to handle muriatic and other acids, cleaning and plating solutions, abrasive slurries, and other destructive media are too fragile or costly, take a look at a line of elastomer-lined, low-head centrifugal units recently introduced. They're available with linings of natural rubber, Neoprene, and Hypalon from Ampco Metal Inc., Milwaukee.

NOVEL CASTING TECHNIQUE— The Precision Casting Div. of Airtron Inc., Linden, N. J., prepares cores for plaster mold casting in separate sections and then bolts them together with hidden studs and nuts. The division says it gives greater control of internal dimensions, insuring greater accuracy in precision cast parts.

HI-TEMP WIRE— Sylvania Electric Products Inc., Warren, Pa., has developed a nickel-clad copper wire that withstands high temperatures, oxidizing conditions, and corrosive atmospheres. Suggested applications: Heating elements in electrical resistance furnaces and hookup wire in induction furnaces.

DIAL FOR PROGRESS—It looks like dials and bulky instruments will soon be outmoded by small luminous panels that operate like scoreboards. Developed by Westinghouse Research Laboratories, Pittsburgh, they'll be used in groups to display numbers and letters. First applications will probably be autos and airplanes.

MORE VACUUM MELTS—Battelle Memorial Institute, Columbus, Ohio, has a new vacuum induction furnace for metal research. The unit will handle melts up to 300 lb and can hold a 1 micron vacuum. Only one man is needed to operate the controls.



U. S. Steel's 40-ton ore car (above) weighs its load automatically and records the data on two tapes. Car operator checks weight on dial scale. The system uses load cells

New Ways To Use Electronic Scales

Combined with teleprinters, strip charts, and punched tapes, load cells provide accounting information for billing, production, and inventory control. It's a natural for automation

THE electronic scale is taking on more jobs in metalworking.

The versatile system has only three basic elements: Load cells, a servosystem, and data presentation devices such as a remote recorder or visual dial. The load cells convert weights into electrical signals. The servosystem interprets the signals by adjusting a balancing potentiometer. It positions and actuates the data presentation device.

Example—H. A. Nielsen, Baldwin-Lima-Hamilton Corp., Eddystone, Pa., sees great developments ahead for weight information. He says one of the country's largest wire mills will shortly be using an electronic system to weigh coils of wire as they are shipped. Here is the way it will operate:

Coils are carried on conveyor hooks to a transfer car which moves back and forth under the conveyor. Each coil is counted and weighed automatically by load cells mounted on the car. The electrical signals from the load cells are transmitted to an office several hundred feet away. Automatic typewriters print the information on tapes which are forwarded to the accounting department. The data are also used for shipping, billing, and inventory control.

A Real Comer—You get an even better idea of the application potential of electronic weighing by considering its advantages over other systems, points out R. B. Zilius, Streeter-Amet Co., Grayslake, Ill. They include:

1. Accuracy isn't affected by impact or vibration. (Sensitivity is 1 part in 300,000.)

2. The devices work well in poor environments. (Examples: Pickling or plating operations, foundries, and water treatment plants.)

3. Weight measurements take only a few seconds.

4. The load cells can easily be

built into an awkward structure like a tall tank, or an elevated sand hopper.

5. The devices are portable.

6. They are easy to install.

7. Cells can't be damaged by overloading. They handle shock loads that do not exceed 25 per cent of the rated capacity of the cell.

More Applications — Electronic scales often can be fitted into a production line to obtain weights during processing. They work well on open hearth ladles, and on machinery that handles steelmaking materials, billets, slabs, ingots, sheets, and coils. You can also use them on cranes, tracks, platforms, conveyors, and tanks.

In some instances, they can be incorporated into the conventional lever types.

Conversion—A large eastern steel mill had a mechanical system to weigh its bar mill products. The automatic dial mechanism was next to the scale platform in the shop area and took a lot of punishment from shock, vibration, dust, and dirt. Inspection showed that knife edges, pivot points, and bearings were beyond repair.

The scale was converted to an electronic type. The platform and scale pit were retained. Four cells (SR-4, Baldwin - Lima - Hamilton) were used on concrete piers. Check rods give the weighbridge proper lateral support.

The scale mechanism was placed in the stock and shipping department about 50 ft from the platform.

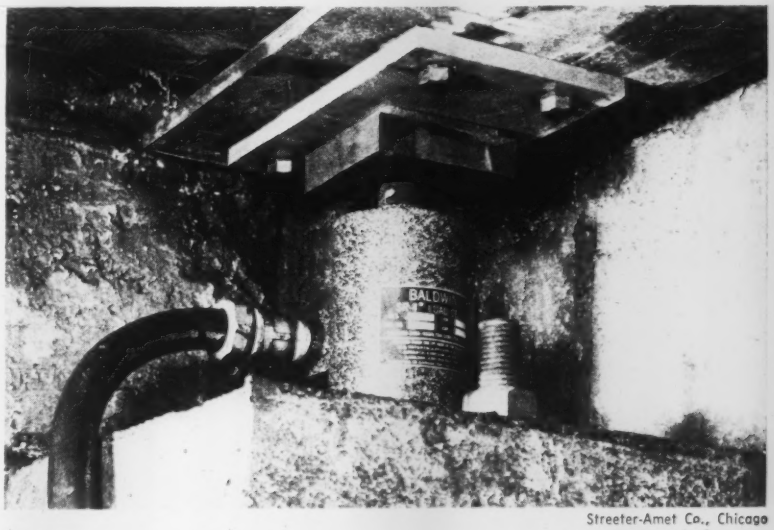
Speed—The electronic method is excellent for the open hearth where charging must be regulated by weight. Charging buggies containing 5 to 10 tons are weighed as they move across a mechanical track scale. The system will determine weights accurately in as little as 3 seconds.

Instruments print the net weights measured by the scale: A push on a button obtains the correct tare weight. The tare weight code appears beside the record for checking purposes. Carbon copies can be made for permanent use by operators, expediters, and stockers.

You can get these types of recording devices: Dials, visual wheels, cabinet, desk, wall, and rack panel models. They can be equipped to use standard 3 and 5 in. tape, small or large tickets, or punched tape. Several recorders can be connected to a single scale, or one recorder can service several scales.

Streeter-Amet Co., Chicago

Automatic coil weighing at Kaiser Steel Corp., Oakland, Calif. Load cells beneath the conveyor register on a dial and tape (left)



Streeter-Amet Co., Chicago

Here is a close-up of a load cell beneath a pipe weighing platform. One cell is located at each corner. A new Cox & Stevens type is smaller and weighs 50 per cent less than this one

Transmission—Telemetering is a method of transmitting weight information from the load cell to a recording device. It is completely automatic except for the initial activation by an operator.

Four methods are used to transmit signals:

1. Small gage wires—they are either privately owned or leased from the telephone company. Some systems can send one signal over a single pair of wires; others handle multiple or bidirectional signals.

2. Power lines—systems which use this method are the multiple signal type or bidirectional for recording or reporting.

3. Radio—this method is rarely used.

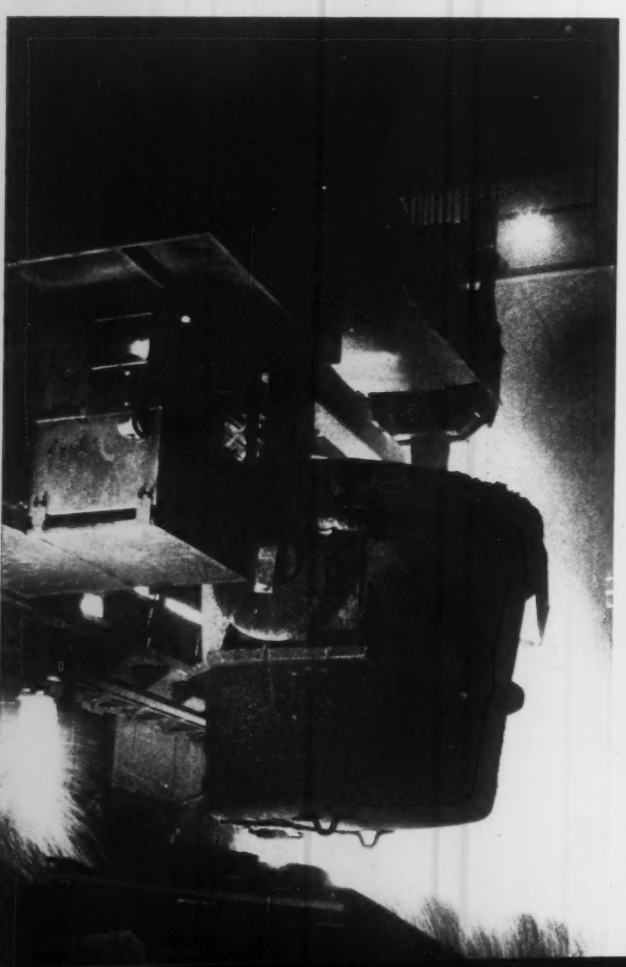
4. Microwave transmission—it is used for long distances.

1954

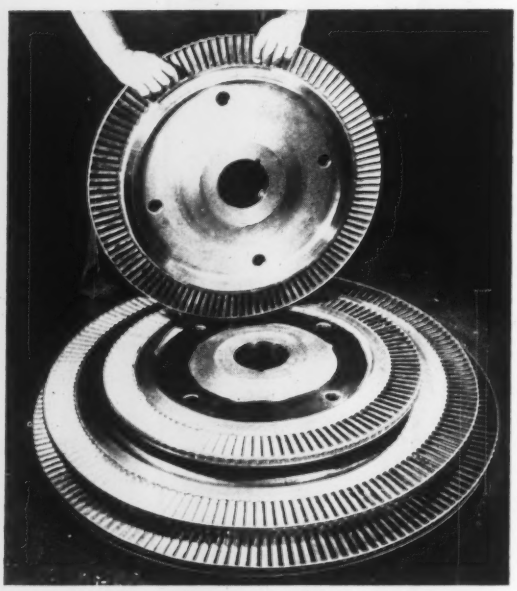
This supertough steel was introduced four years ago in a series of unusual tests at Birmingham. STEEL published an on-the-spot report (left). The photo on the right was taken at the demonstration

These Steels Have What

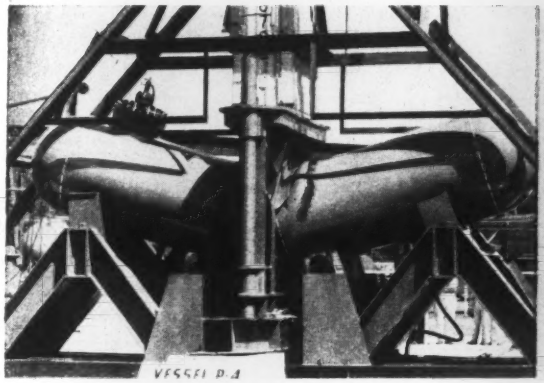
High strength of quenched and tempered steels provides weight saving and economies without sacrificing safety or ease of fabrication. Designers will make greater use of them



Ladle hooks on this crane were decreased from 8½ to 6 in. in thickness by using T-1 steel. Weight saving: 3 tons per set. Operator's visibility was increased. Welding was done with AWS E12015 electrodes



T-1 trimmed 60 per cent from material costs of these rotor discs for small turbines. Elliott Co., Jeanette, Pa., uses quenched-tempered and stress-relieved circles which it machines and drills



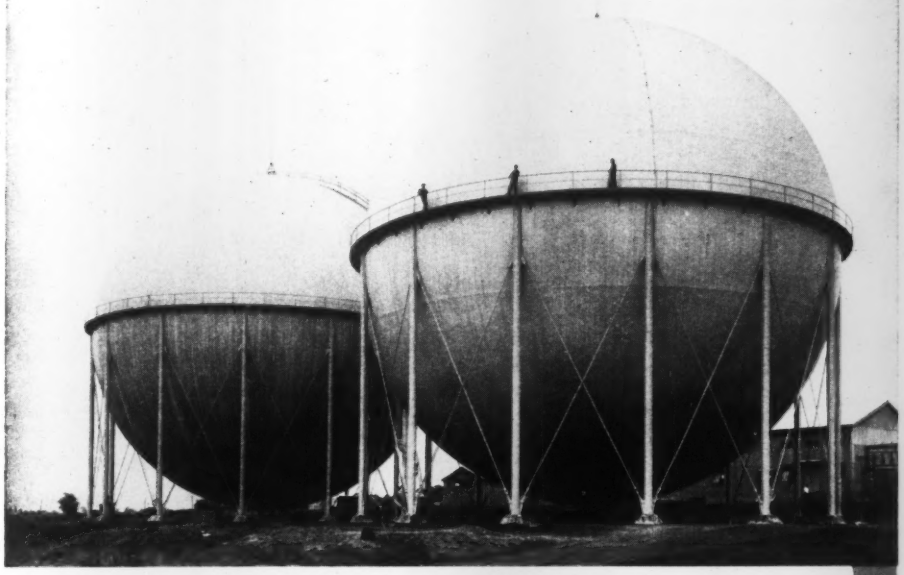
In this rupture test, a 13-ton ingot was dropped 101 ft. The vessel was cooled to minus 45° F and was under an internal pressure of 1875 psi. Failure was in a ductile manner. Welds were intact, and the metal didn't shatter

the Users Want

THIS is the success story of a new alloy that was developed for a known need: U. S. Steel Corp.'s T-1, a heavy-duty steel that enables industry to build bigger and stronger tools, equipment, and structures without paying the penalty of greater mass.

The list on the right will give you an idea of how the steel has caught on since its introduction only four years ago.

Why It Grew — T-1 is a quenched and tempered alloy steel with a yield strength level about three times that of structural carbon steel. It contains a number of alloy-



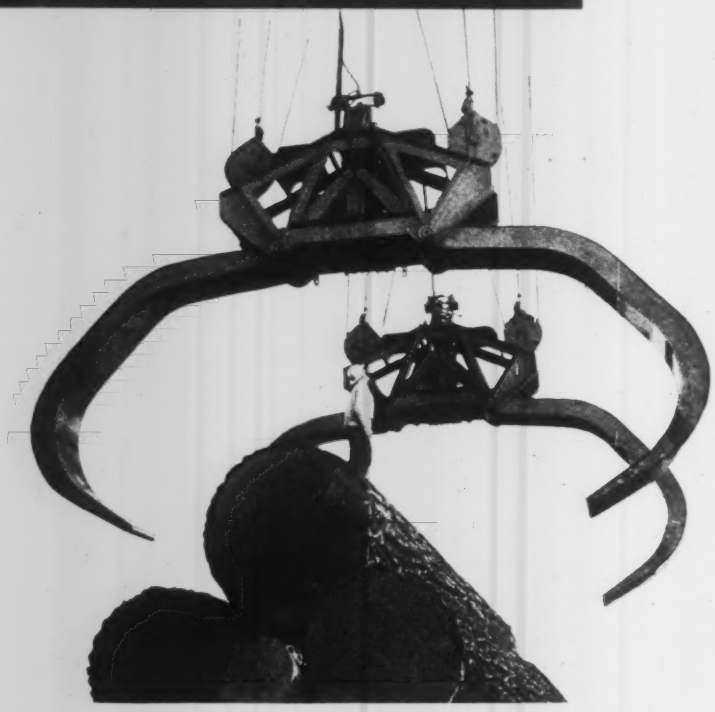
These pressure vessels, erected in Japan, couldn't have been built without T-1. With carbon steel, shell walls can't be over 1¼ in. thick, the maximum without stress relief after welding. This would mean six vessels for the same capacity

1958

WHERE T-1 IS BEING USED

- Coal chutes and trimming machines
- Ore car bodies
- Conveyor buckets
- Pressure vessels
- Trailer truck frames
- Blast furnace skip cars
- Dragline buckets
- Eye bars for bridges
- Fan blades
- Generator flywheels
- Housings
- Pressure plates for punch presses
- Turbine discs and diaphragms
- Pump discs for dredges
- Power shovels
- Ladle hooks
- LP-gas tanks
- Jigs for heat treat fixtures
- Flue liners for blast furnaces
- Penstocks for hydroelectric plants
- Missile frames, launching devices
- Arms for industrial lift trucks
- Dipper sticks
- Dump trailers
- Liners for coal washing equipment
- Offshore drilling rig columns
- Skis for sleighs
- Lip sections on buckets
- Overhead cranes
- Bridges
- TV transmission towers
- Chain side runners
- Spiral scroll casing for turbines
- Plate hooks
- Road scraper bottoms
- Shovel buckets
- Surge tanks
- Synchronous condensers
- Tie plates in forging hammers
- Wear plates
- Atomic energy pressure vessels
- Crusher feed cone
- Bulldozer liners
- Coke bins
- Flex plates for wind tunnel nozzles
- Air storage tanks for wind tunnels

Uses of T-1 Steel



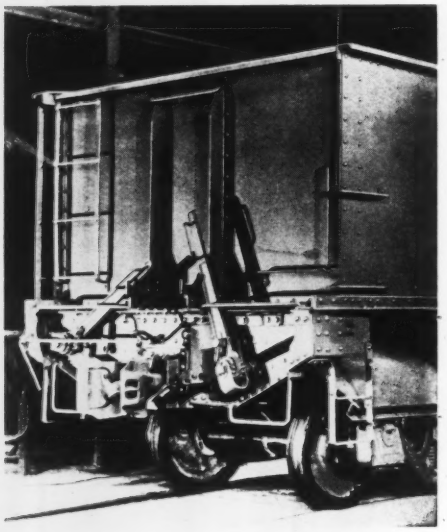
These log grapples weigh 30 per cent less than their mild carbon steel counterparts. They have plenty of strength and toughness to resist bending when the blades narrow to a point. They lift 75 tons

ing elements, but each is used in small amounts for a definite purpose. A typical composition: C, 0.15 per cent; Mn, 0.92; P, 0.014; S, 0.020; Si, 0.26; Ni, 0.88; Cr, 0.50; Mo, 0.46; V, 0.06; Cu, 0.32; B, 0.0031.

Each element has its job to do: 1. Low carbon is essential for toughness and weldability. 2. The small amounts of manganese, nickel, chromium, molybdenum, and boron (in combination) give hardenability and insure that transformation on quenching will provide the most desirable structure. 3. The trace of vanadium enables the alloy to keep high strength after tempering at relative high temperatures or after long stress relief treatments. 4. The small amount of copper increases resistance to atmospheric corrosion.

Applications—Compared with steels of lower yield strength, T-1 offers designers advantages in three situations:

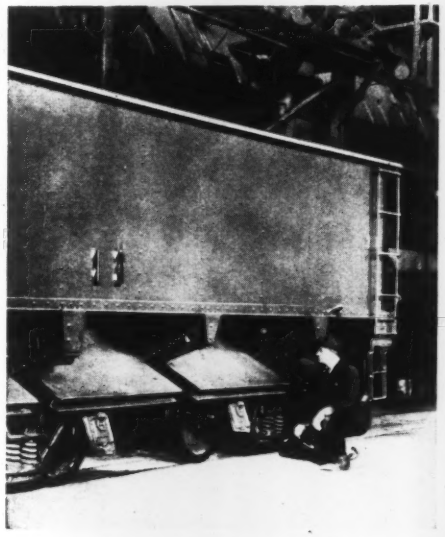
- In applications (such as pressure vessels) where its higher cost per pound can be offset by reduction in cross section. There is a saving in material costs; secondary benefits add to over-all savings. (T-1 costs about two and one-half times more than carbon steel,



Sixty ore cars like this, built for International Nickel Co., use T-1 for sides, ends, doors, and hoppers. They stand

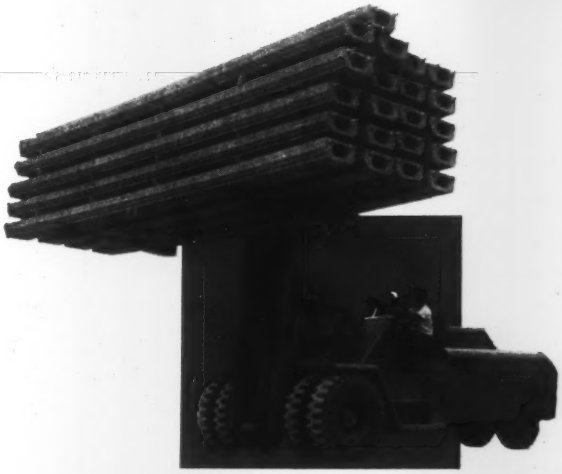
T-1 offers toughness and strength at a minimum weight. It eliminated a heat treating operation on forks for this lift truck

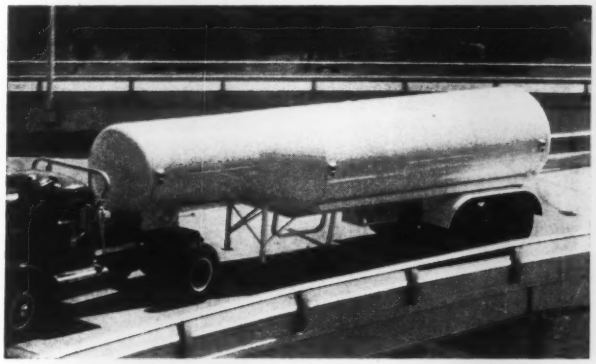
T-1 reduced the thickness of the steel (from 3/8 to 1/4 in.) for this transformer tank. Weight saved was over a ton. It's a new, lighter weight portable transformer built by Maloney Electric Co., St. Louis



jarring shock at low temperatures. Plates for sides and ends were 1/4 in. thick; those for doors, 3/8 in.

These new ore cleanup buckets made of T-1 plates, 2 1/2 in. thick, are 1/2 ton lighter than the cast trays they replaced. Abrasion resistance and toughness were properties needed





Use of T-1 (vs. A-202) added 500 gallons to the capacity of the LP-gas tank trailer. Case 1204, ASME boiler code, permits designer to go to 26,250 psi. A-202 has a value of 21,250 psi.

This Drott, skid-shovel bucket uses T-1 to cut weight 35 per cent. The hydraulically operated buckets function as a dozer, scraper, excavator, and loader. Weight saving is significant but abrasion resistance and toughness are also important

but it has three times its yield strength. It costs one and one-half times more than high strength, low alloy steel, but it has twice its yield strength.)

- In applications (such as shovel buckets) where a smaller reduction in cross section may give little or no saving in the cost of material but secondary benefits add up to substantial over-all savings.
- In applications (such as mine car bottoms) where there is no reduction in cross section and the cost of the material is higher but important secondary benefits assure attractive savings.

Secondary benefits come from several sources: 1. In many instances, total job welding costs are lowered because of reduced gages, and preheat generally is not required. 2. No stress relief is needed. 3. Equipment life is longer, and maintenance costs are lower. 4. Equipment can be lighter; space savings may also be significant. 5. Foundation and erection costs are less. 6. Freight is less.

Availability—About two years ago, U. S. Steel licensed Lukens Steel Co., Coatesville, Pa., to produce and sell T-1. Both companies make plates and U. S. Steel produces bars in two conditions: One is made to 90,000 psi minimum yield strength and 105,000 minimum ultimate tensile strength. The other is furnished to a minimum Brinell hardness of 321.

When resistance to impact abuse and abrasion is the principal requirement, the higher hardness material is used.

Bars and semifinished products for forging are available in the unheattreated condition. The user must quench and temper to bring out the properties of T-1.

As experience is gained in production, it's expected that T-1 will become available as high yield strength strip, sheets, and structural shapes. They will open up many new avenues in design.

Lukens has produced T-1 clad with 304 stainless for special applications. It combines high yield strength with corrosion resistance.

Applications—T-1 is more desirable than previously used steels for LP-gas transports fabricated to the ASME code. Pay loads are increased because the high strength of the material results in lighter construction.

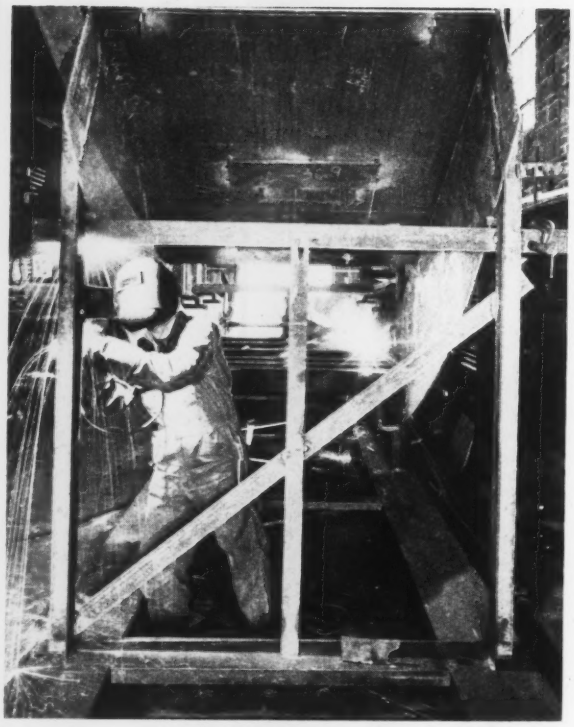
T-1 is used for flatbed highway trailers where weight again is an important consideration. It has allowed some manufacturers to reduce the weight of a unit by more than a ton. This permits heavier loads and haulers can still meet state requirements for maximum loads. An additional benefit comes from the material's superior abrasion resistance.

T-1 also is being used as compression members in the construction of television towers.

For better impact and abrasion resistance, the 321 Bhn grade is used for conical parts going into fly ash cooling systems—they're used in burning coal in central power stations.

When used for shovel and dragline buckets, T-1 provides a reduction in weight (increasing the pay load) and longer service life through abrasion resistance. (The photographs show other applications for this heavy duty steel.)

Fabrication—Most fabricators have regarded T-1 as a new plate steel and are developing forming and fabrication procedures for their shops.



T-1 was selected for this coal trimming machine to combine strength with abrasion resistance

The high strength level of T-1 requires care in fitup and in welding. If full joint efficiency is needed electrodes of the E110XX or E120XX type should be used. If elevated temperature service or thermal stress relieving is contemplated, the use of Ni-Mo-V electrodes should be avoided to prevent the possibility of weld metal embrittlement. When 100 per cent joint efficiency is not required, certain low-hydrogen coated electrodes of a lower strength level will prove adequate and compatible with T-1 steel.

Pressure vessels of various types have been made of T-1. Some have been constructed in accordance with Code Case 1204 which permits the use of design stresses which are one-fourth the tensile strength of the metal.

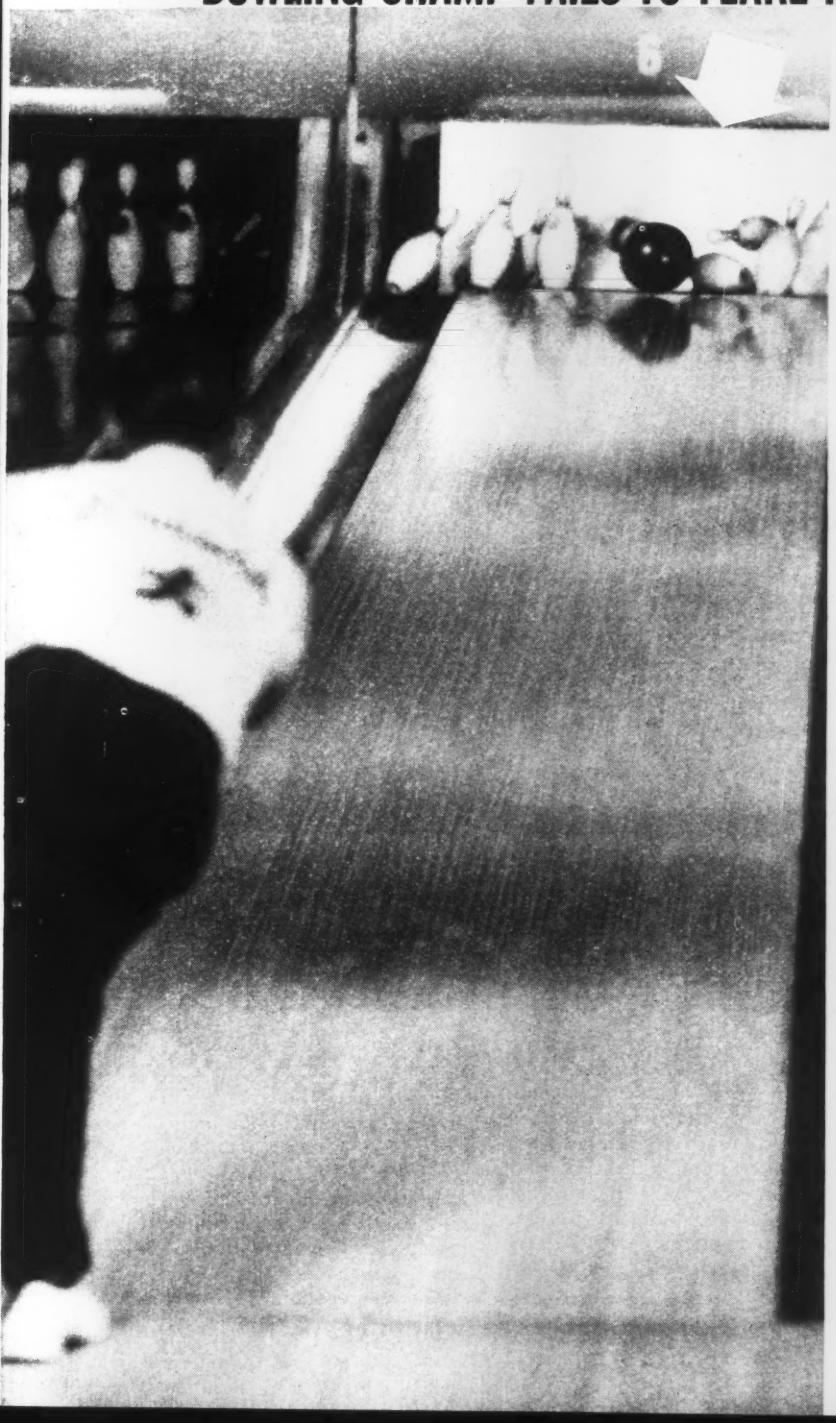
Other vessels have been fabricated essentially in accordance with the code but did not fall under its jurisdiction. Examples: The spherical gas storage tanks constructed in Japan which are 110 ft in diameter (see Page 127) and several cylindrical air storage tanks, 52 ft long with an 11 ft ID, which were constructed for an NACA wind tunnel.

T-1 may be readily cold formed or angle bent if sufficient power is available and suitable bending radiuses are used. Springback allowances must be greater than those for structural carbon steel.

It may be as readily gas cut as structural steel. Preheating is not needed. In machining, speeds and feeds should be the same as those used for any alloy steel of similar hardness (about 275 Bhn).

Three-time ABC winner, famous bowler BILL LILLARD slams in strike after strike sending ball and pins flying against piece of TI-CO set up in pit. Close up examination by Bill shows plenty of punishment but no flaking. TI-CO's zinc coating rolled with the punch!

BOWLING CHAMP FAILS TO FLAKE INLAND TI-CO®!



Switch to **TI-CO** Non-Flaking Galvanized saves manufacturers up to 15% in Production Costs.

A well-known garage door manufacturer dispensed with plating operations—reduced costs 10%. A leading furnace manufacturer saved $20 per thousand parts produced by eliminating cleaning and painting. A company making roller gravity conveyors cut out similar operations. These are just a few of many case histories of manufacturers who realized important savings and improved their product when they started using TI-CO Galvanized Sheets.

Whenever a product requires the strength of steel, plus corrosion resistance, Inland TI-CO is the most satisfactory . . . the most practical . . . the most economical material to use. That's because TI-CO is produced with a zinc coating that will not flake even under the toughest conditions. The coating stretches with the base metal during fabrication. Deep drawing, brake or roll forming, crimping, stamping, lock-seaming even severe spin-drawing . . . TI-CO takes them all in stride with no flaking or peeling. With TI-CO there's no need for costly dipping or touching up. And the uniform, bright spangled finish adds to the over-all attractiveness of the product.

If you're manufacturing or designing a metal product that requires corrosion resistance, consider TI-CO Galvanized Sheets. Manufactured in coils or cut lengths up to 60" widths, gauges 8 to 30 inclusive. Consult your local steel distributor or Inland sales representative. Write today for a free informative booklet on TI-CO.

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ALLOY and low carbon steel ingots have much in common, but there are important differences which become more obvious after examination of a few stainless steel ingots:

1. Scaling—The high chromium content of stainless steels decreases the amount of surface oxidation of ingots in the soaking pits. For this reason, it is important to maintain the best pouring practices. Many ingot surface defects that would be scaled off in low alloy steel are changed little by the heating cycle for stainless steel. If temperatures sufficiently high were used to scale off scabs, intergranular oxidation would be severe. Such oxidation would cause rupturing during the blooming mill operation.

2. Inclusions—By adjusting the ladle analysis of the steel, it is possible to exert some, but not enough, control over the amount of inclusions entrapped in the ingot surface. It is particularly important to produce clean steel so that there will be less opportunity for surface defects from entrapped inclusions.

3. Yield—In hot-rolling slabs to coils, emphasis is on yield. It is affected by weight loss from slab conditioning to remove ruptures and cracks generated during primary hot working. It is likewise influenced by the edge and surface conditions of the coils after final hot rolling.

4. Chemistry—The chemical analysis of steel influences hot working, cold working, and continuous annealing cycles. Phase equilibriums of austenite and ferrite can be maintained at optimum levels for hot and cold working by the proper balance of chemical elements. Time and temperature specifications for standardized continuous annealing cycles can only be established with knowledge of the possible variations in chemistry due to segregation in the ingot.

5. Deoxidation—Chromium content creates a potential source of inclusions. They must be prevented, or restricted, by residual deoxidizing elements which preferentially unite with oxygen. However, the cumulative effect of these elements on the microstructure and physical properties of the alloys prevents their indiscriminate use.

Looking Inside Stainless Ingots

By J. C. FULTON
Chief Research Metallurgist, Melting Research & Development Laboratories
and R. H. HENKE
Manager, Quality Control
Brackenridge Works
Allegheny Ludlum Steel Corp.
Brackenridge, Pa.

A NUMBER of metallurgical factors must be compromised in processing stainless steel (see above). It is frequently impossible to fully correct for one variable for fear of losing control on another. Since the literature on stainless steel does not offer much assistance in solving such problems, we studied solidification by examining the as-cast structure of some ferritic and austenitic stainless alloys.

Observations were made on commercial size ingots of straight chromium (17 Cr) and chrome-nickel (generally 18-8) stainless steel. The ingots were prepared by torch cutting off-center, machining flat to the center plane, then etching with 50 per cent hydrochloric acid in water. Ingots from 60 and 70 ton electric arc furnace heats were used.

Fig. 1 and 2 demonstrate a basic difference in the type of grains in as-cast austenitic chrome-nickel and ferritic chromium stainless alloys. Ferritic alloys (17 Cr) (Fig. 1) solidify so that there are columnar grains on the periphery and equiaxed grains at the center of the ingot; the austenitic alloys (18 Cr, 8 Ni) (Fig. 2) consist of an entirely columnar grain pattern.

Grain Structure—The occurrence of all-columnar grain in the chrome-nickel alloy, compared with columnar and equiaxed grains in the straight chromium ingot, can be accounted for partially by the difference in thermal conductivity. The chrome-nickel alloy has a lower thermal conductivity than the straight chromium, indicating that solidification of the chrome-nickel ingot takes place under a larger thermal gradient.

The progressive nature of the solidification process by which columnar grains form, results in a concentration of shrinkage along the ingot axis. Slab shaped molds appear to help diminish this problem. Central shrinkage is not so severe in the ferritic alloys, but it still operates in the same manner.

The presence of all-columnar grains in the chrome-nickel alloy is also evidence that constitutional supercooling does not occur in it. It may be present in the straight chromium alloy. (There are equiaxed grains at the center.) However, one condition required to have constitutional supercooling is segregation of at least one of the elements which lower the melting point of the alloy. This does not happen.

Segregation—Macrosegregation is known to occur to an appreciable extent in rimming and other low carbon steels. On the basis of chemical analyses obtained from ingot samples, there does not appear to be much macrosegregation in either the 17 Cr or the 18 Cr, 8 Ni alloys.

Microsegregation is, of course,

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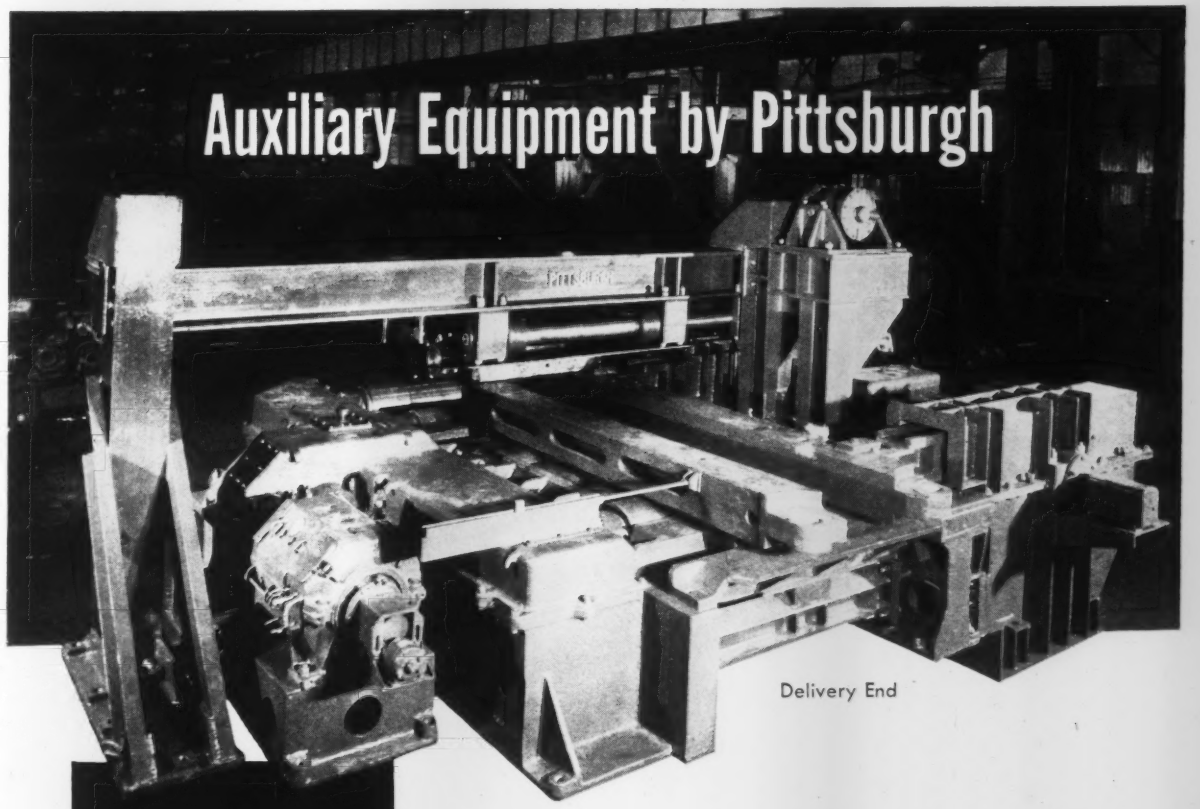
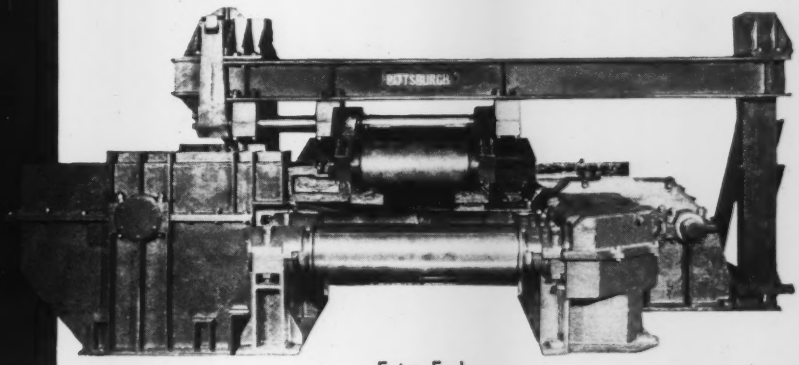


Delivery End

slab scarfer table with holddown roller and adjustable guides



Entry End

This Slab Scarfer Table is a typical example of the wide variety of auxiliary mill equipment designed and built by Pittsburgh Engineering and Machine.

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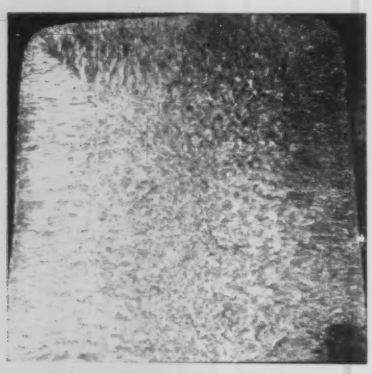


Fig. 1—(Top) Macroetched grain structure on the longitudinal center plane of a Type 430 stainless steel ingot. (Bottom) Half of transverse plane at midheight of the same ingot. The ingot measured 19 x 35 x 59 in. and was poured at 2870° F

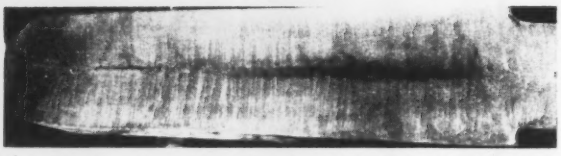
present in both alloys. In the 17 Cr alloy, a carbon depleted rim was formed during solidification adjacent to the carbide envelopes around areas that were originally all austenite (Fig. 3). This type segregation is potentially harmful to strip products if it is not completely destroyed in processing. (It probably would have little influence on bar products.)

This peculiar variation of carbon-containing constituents in the straight chrome grade could be important in designing hot and cold rolling practices which avoid the condition known as ribbing on finished cold rolled strip, or roping on drawn products. But small ferrite plus carbide islands formed in the Cr-Ni grade (Fig. 4) can be controlled by chemistry and high temperature heating of the mill products. Their quantity is much less than for the straight chromium grade.

Inclusions—To further investigate segregation and try to establish some basic information on inclusions, a number of samples were examined by combining metallographic, x-ray, and spectrographic methods. The spectrographic analyses and metallographic examination indicated that we should expect to find complex silicates in the steel.

We expected that some of the inclusions would be compounds of such oxides as alumina, silica, and chromic oxide. Inclusions precipitated from the liquid during solidification of the ingot would naturally form high temperature compounds which were combinations of these pure oxides. But x-ray results on inclusions always indicated low temperature forms of pure alumina and silica. A tentative interpretation of the low temperature structures is that they are a product of the process used to extract the inclusions rather than representative constituents of the steel.

Source—It would be expected that the alumina and silica would be precipitated between the dendrites in such an intimate fashion



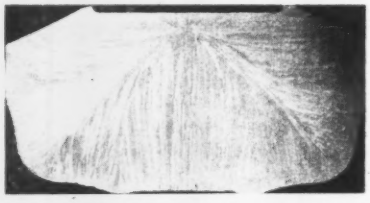


Fig. 2—(Top) Macroetched grain structure on the longitudinal center plane of a Type 302 stainless steel ingot, poured at 2820° F. (Bottom) Half of transverse plane of a Type 302 ingot of approximately same analysis as shown at top

that the formation of $3Al_2O_3 \cdot 2SiO_2$ or other compounds could not be avoided. Evidence of this is the size of the inclusions, which seems to suggest that they are definitely of indigenous origin.

The extent of entrapped oxides which can occur was demonstrated by examination of an ingot of Type 430 in which interdendritic films of oxide existed from the surface to the center. Judging from the spectrographic results, the material was either entrapped ingot scum or a combination of ingot scum and slag. The relatively high calcium value of the sample at the center of the ingot indicated the presence of slag particles. Such inclusions can be present as a result of slag which does not have time to levitate in the ladle before teeming, or from erosion of the slag coating on the walls of the ladle due to previous use.

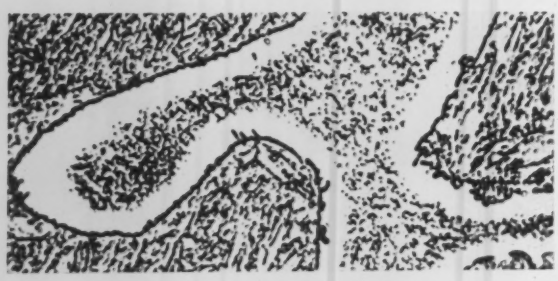


Fig. 3—As-cast microstructure of same Type 430 ingot shown in Fig. 1, showing pronounced segregation of carbon. Etch: Ammonium persulfate. X1000

Fig. 4—Carbide islands in the same Type 302 ingot shown in Fig. 2. They consist of a ferrite matrix with a carbide envelope and carbide precipitates. Etch: Sodium cyanide. X1000

61 models

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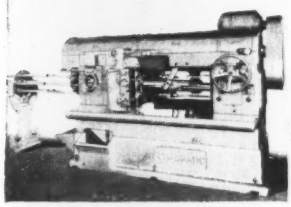

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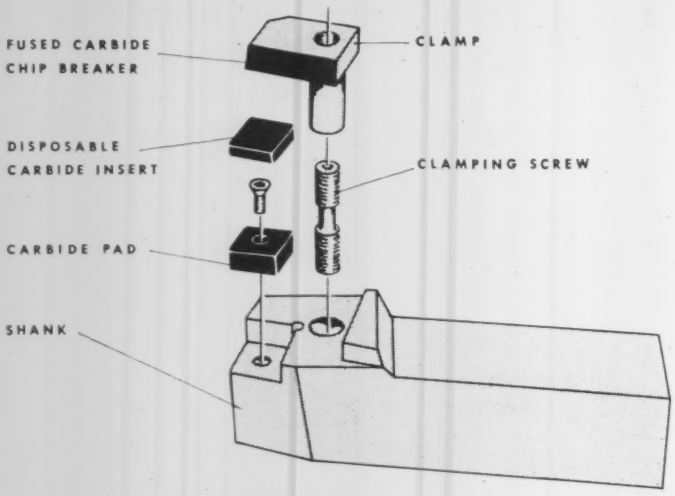

Here's a suggested toolholder that meets the requirements mentioned by Mr. York. The clamping screw on this one can be operated from either the top or bottom, facilitating removal regardless of holder position

Key to Disposable Cutters

Toolholder must hold tip rigidly and position it accurately. There's little agreement on how holders should be designed, but here are fundamentals that should be considered

By HAROLD YORK
Carbide Products Design & Application Engineer
Metallurgical Products Dept.
General Electrical Co.
Detroit

CUTTING TOOLS with disposable inserts (they're discarded rather than reground) bid fair to become the most common of all single-point tools.

The toolholder is a critical factor in their use. Even the experts don't agree on just how it should be designed, but there's general agreement on some of the fundamentals.

Twofold — The toolholder has two jobs. It must hold the tip rigidly and position it accurately. The recess in the holder locates the insert. The recess must be machined accurately since its precision determines the accuracy with which the insert can be positioned and indexed.

The recess ought to be deep enough to allow the top of the assembled insert to project slightly above the toolholder. This means the back cutting edges of the insert are exposed, and they aren't likely to chip during cutting, when normally a slight movement or "working" of the insert will take place.

The bottom of the recess must be flat to prevent rocking of the insert. The bottom corners should have a fillet to avoid stress concentration during heat treatment and during use of the holder.

The Pad—Use a carbide seat or pad under the insert. It should be made of an impact resistant grade of carbide, and both top and bottom faces should be ground flat and parallel.

This pad provides additional carbide material for heat transfer, minimizing heat concentration at the nose of the insert. In addition, the strong carbide pad will prevent deformation of the shank by transmitting the cutting loads over a larger area. In many cases, the pad will let you use harder inserts to get increased production through faster cuts and longer tool life. The pad ought to be retained mechanically in the recess, so it won't fall out during indexing or replacing of the insert.

Clamping — Maximum clamping pressure should be exerted as close as possible to the cutting edge and nose of the insert. This keeps it from tilting. A gap between the bottom of the insert and the carbide pad would promote cracking of the insert. The clamp should not obstruct chip flow. With no chip blocking, you can go to full depths of cut.

All clamps should separate from the insert easily when they are opened so the operator doesn't have to juggle hot holder parts when he is indexing inserts.

Chip Breakers—The clamp can also act as a chip breaker. The chip breaking surface should be covered with carbide to withstand wear. A piece of carbide may be brazed to the clamp, but if you cover the surface with a fused carbide coat, there's no braze to soften or weaken when the cutting tool gets hot.

Clamp-chip breakers can be fixed or adjustable. On a fixed clamp, the breaker is effective only within a given range. It is controlled by its fixed distance from the cutting edge. To increase this distance for heavier feeds or to reduce it for lighter feeds, different sizes of fixed clamps are needed.

The adjustable clamp and breaker is probably better for job shop operations, where cutting conditions change continually. This one can be altered so the distance from the breaker to the cutting edge will be

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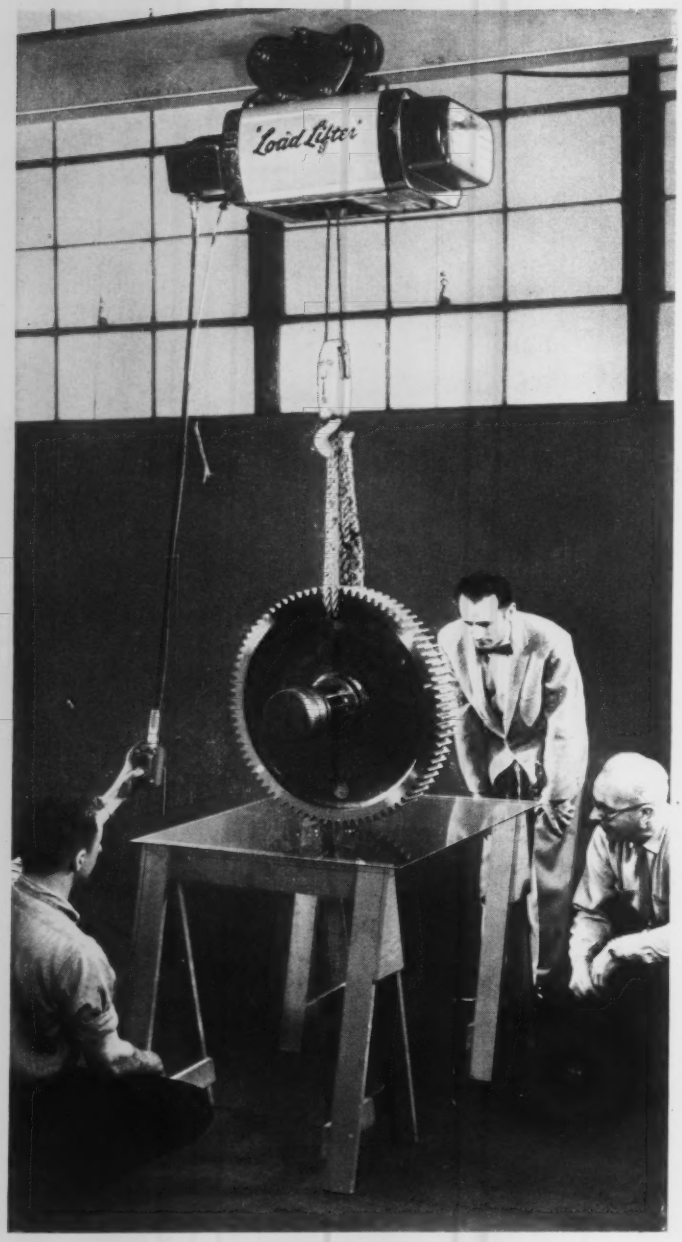

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right for a variety of feeds.

Shank Hardness — The shank should be made of high carbon steel or medium carbon alloy steel. Heat treat to get a hardness of 38-42 Rockwell C with minimum distortion and stress.

Negative Rake—The most popular holders are negative in both side and back rake. They offer the largest number of cutting edges per insert.

Disadvantages: Negative rake tools usually result in higher cutting forces and pressures on the workpiece. Parts with thin sections, like small diameter shafts, may not stand the pressure. In such cases, it may be necessary to go to positive rakes, knowing you'll get fewer usable cutting edges per insert.

A final point: For lower initial cost, minimum inventory, easier and quicker service, you'll be ahead to standardize on clamps, pads, and inserts that will cover the widest possible range of styles and sizes of holders.

Material Courses Offered

Two short courses on materials will be offered this summer by Pennsylvania State University. Purpose: To keep design engineers and researchers abreast of developments.

Scheduled for June 29 to July 3 is a course on engineering design for high temperature applications. It'll cover properties of materials for use in rockets and missiles, gas and steam turbines, aircraft engines, nuclear powerplants, and equipment for the petroleum and chemical industries.

From July 7 to 11, a course on mechanical properties of materials will be given. It'll deal with such things as hardness of metals, behavior of plastics under simple and combined stress, creep resistance and high temperature properties, fatigue strength, effects of radiation, recent developments in test machines and instrumentation, and metals under high speed loading.

Lectures will be given by prominent engineers and scientists. For further information, write to the Department of Engineering Mechanics, Pennsylvania State University, University Park, Pa.

Workman is spraying racks with heated primer. Forty ft of hose and mobile platform for heater and pressure pot give him an almost unlimited reach

Hot Paint Improves Spray

Heat replaces reducing solvents and speeds painting. One firm uses the method to get up to one-third more production. Half a dozen advantages are cited

RED lead dries faster if you spray it hot.

That's the way Offenhauser Co., Houston, finishes 15 tons of steel every day. No additional facilities or personnel are needed.

The firm manufactures items varying from Hastelloy pressure vessels to architectural aluminum products.

Advantages—F. E. Kiel, Offenhauser's foreman, says that the hot spray's biggest advantage is faster drying. His opinion: "If you put red lead on in a heavy, single coat, it will be out of dust in 15 to 20 minutes. It won't scratch off so easily, and there is less balling."

The firm controls the paint heat to maintain constant viscosity and to reduce it to a level below that ordinarily obtained by adding solvents. When the red lead atomizes, fast solvents still in the mixture evaporate between the gun and steel, leaving a film high in solids.

Such a film gives the user a choice. He can apply a heavier build of red lead with less danger of runs and sags, or he can spray faster and get more coverage per hour.

Here are some other advantages cited:

- Less solvent is needed. Offenhauser used to reduce the red lead 50 per cent. It doesn't use any reducer with the hot spray method.
- Savings are said to average 25 per cent.
- Less air is needed.
- Overspray is reduced.
- Application is easier.
- Thickness of the paint film is more uniform.

Offenhauser uses equipment made by the Spee-Flo Co., Houston.

OLD METHOD

1400 pieces per hour. Operator puts pins in the die cavity, then moves two hand levers simultaneously to operate the press

NEW METHOD

3100 pieces per hour saved 95 per cent of unit production cost. Hopper, chute, and transfer arm boosted output 120 per cent. One operator now services two or three presses

COST CRISIS—How To Beat It

Feeder Slashes Burnishing Costs 95%

When Lamson & Sessions engineers designed an automatic feeder to replace hand loading on a small press, the change paid for itself in a month. The job: Burnishing small steel pins

THE PROBLEM: Keep production costs down while demand rises for small steel pins.

THE SOLVERS: Production men and industrial engineers at Lamson & Sessions Co., Cleveland.

THE SOLUTION: An automatic feeder.

The Story—An operator, sitting at a small Denison hydraulic press, put pins in the lower die, one at a time. When the pin was in position, she pressed two levers simultaneously; the pin was burnished and dropped through the die into a keg.

Her output: A respectable 1400 pins an hour.

First Step—Chester Herbkesman, chief industrial engineer, says the first step was to redesign the die so it would take two pins. This way, the operator used both hands to load, then pressed the levers. Parts still dropped through the die into the keg.

This simple improvement boosted production to 1900 parts an hour and cut the burnishing costs per pin 36 per cent.

Final Stage—Armed with these savings as evidence of potential, and an idea for automating the operation, Frank Davis, chief development engineer, convinced management he could design a feeding mechanism to boost production still further and lower unit costs even more.

The Go-Ahead — Management O.K.'d the project and Mr. Davis went to work. First, he redesigned the press base, putting it on a 30-degree slat to aid gravity feed of the parts through a chute. Then, he integrated design for a hopper feeder that would orient the pins and start them, single file, down the chute.

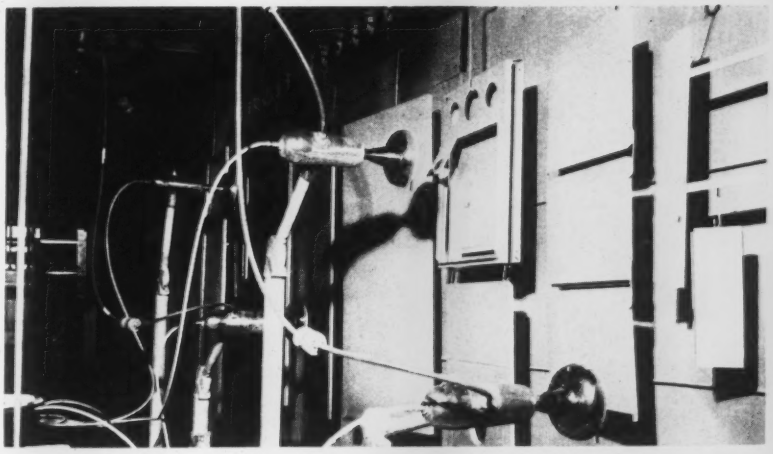
At the lower end of the chute, Mr. Davis worked out a "fan" arm that picks up the pins, one at a time, and swings them into the center of the die, dropping them into the lower die cavity.

Result—The operator now dumps pins in the hopper and guards against jams in the chute. One operator can service two or three presses. Presses now are set on automatic, repeat cycles.

The production rate is 3100 an hour per press. Unit costs, shaved by 36 per cent in the change from single to double die manual feed, have been cut an additional 59 per cent—a total saving of 95 per cent of the original cost. The change paid for itself in one month.

COST CRISIS series

. . . to help industry achieve lower unit production costs. The accompanying Lamson & Sessions example and others to follow are samples of what the editors of STEEL are looking for in their nationwide search for companies that have achieved important cost savings through more efficient use of capital equipment. Does your company qualify? If so, enter the Cost Crisis Awards Competition. See STEEL, Feb. 10, p. 54, and write to the Cost Crisis Editor, STEEL, Penton Bldg., Cleveland 13, Ohio, for your awards kit.



Furnace panels and fillers are hung in sequence to simplify assembly. Four atomizing bells are used to coat panel fronts, two to put light coating on backs

ELECTROSTATIC PAINTING:

Saves $11,000 in 3 Months

WHEN Waterman-Waterbury Co., Minneapolis, modernized its finishing department, electrostatic spray painting equipment was installed to replace hand methods.

Roy Lonson, vice president, reports that the new setup saved the company over $11,000 during the first three months of operation. Production increased; paint went farther; and overtime was cut.

Working Time—The fabricating department had been working 80 hours, paint and assembly departments 60 hours. Increased conveyor speeds made possible with the new painting techniques allowed the working hours of the paint department to be cut to 40. The fabricating department increased its working time to 96 hours.

The company makes gas and oil heating and air conditioning equipment. Before modernization, it was assembling one furnace in 5 minutes; now its rate is three in 6 minutes.

Furnace Parts—About 30 painted parts go into a furnace unit. They're in three colors—white and two shades of green. A uniform, high quality coating on the outside furnace panels is essential. Inside parts are considered "fillers."

An important part of the finishing operation, explains Mr. Lonson, is the hanging of parts in proper sequence to simplify the next step in assembly and shipping.

Workholders — Parts are hung on three types of workholders. Secondary hooks are used to increase the number of pieces handled in the single painting operation. Hooks are placed on 8 in. centers on the conveyor in various combinations.

Panels up to 65 in. high are hung vertically. The largest, 96 in. high, run horizontally. The longest run for one model is about 11 hours, the shortest about 4 hours.

Paint Mileage—With hand painting methods, says Mr. Lonson, a half gallon of enamel was used to paint one casing. With the Ransburg No. 2 electrostatic process, the company gets up to six units per gallon, plus improved quality.

Formerly, 6 gallons painted 270 pieces; now 2½ gallons cover 750 pieces, he explains.

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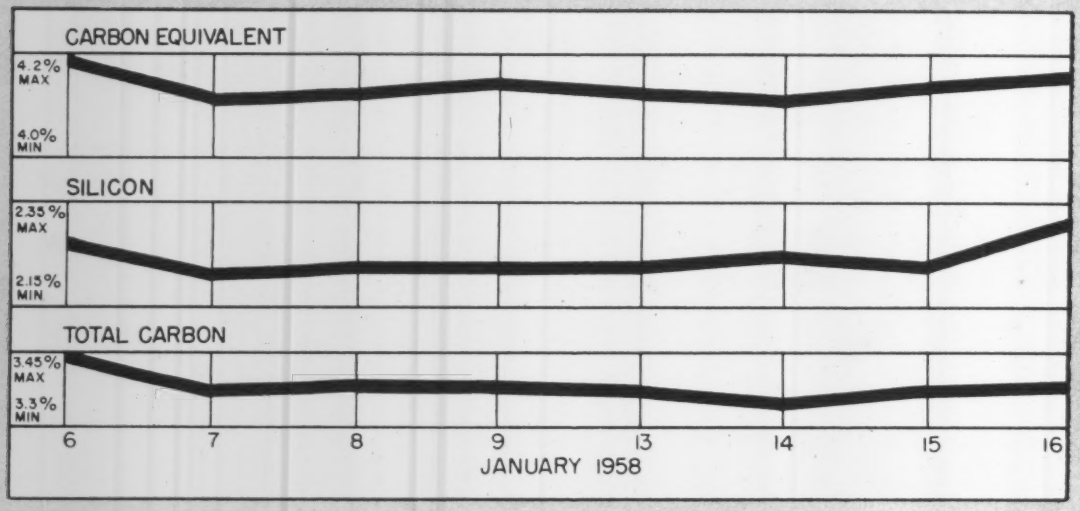
Hot Blast Improves Control



Uniformity of chemistry control resulting from hot blast shown for Jan. 6-16 period

Buyers Get Better Castings

Hot blast melting has a lot of customer appeal: Casting quality is improved and deliveries are speeded up. System gives foundries better control and greater flexibility of operation

A CLEVELAND foundry uses the hot blast system of melting to provide its customers with a better product and prompt delivery.

By heating the air that combines with the coke in the cupola, the company, Superior Foundry Inc., is able to: 1. Tighten control of chemical composition. 2. Pour thinner walls. 3. Reduce the possibility of chilled edges.

Most of the system's advantages stem from higher pouring temperatures and increased flexibility, says Alexander D. Barczak, plant manager.

Higher Temperatures — Castings with thinner walls can be poured when temperatures are higher. There is less chance of chilled iron forming on the edges of thin wall castings ($\frac{1}{4}$ in. and under). Reason: The more time it takes the casting in the mold to cool down to the critical point, the less the tendency to chill. The critical point is 1250 to 1450° F, depending on the composition of the iron. By pouring at a higher temperature, cooling time is increased.

Superior's tapping temperatures are now between 2780 and 2820° F. Before its hot blast system was installed, tapping temperatures were 2750 to 2780° F when the cupola was running steady. But it took 30 to 40 minutes to reach those temperatures after a shutdown. The foundry had to divert its electric furnace from the production of high tensile iron to bring the cupola iron up to temperature.

The new system enables the cupola to reach 2780° F in a couple of minutes after shutdowns of an hour or longer.

Flexibility — "When demand for castings is high, the hot blast enables us to melt iron faster than we could without it," Mr. Barczak says. "When demand is low, we can melt at a slower rate than we formerly could and still maintain high spout temperatures."

The top melting rate with a cold blast was 14 tons an hour, vs 16 tons an hour with a hot blast.

Although it is generally believed that a volume of 100 tons a day is needed to make the system pay for itself, there are advantages at lower levels of production, points out Mr. Barczak: Compared with a cold blast system, a foundry can pour continuously throughout the day at a lower level of production. In slack times, some jobbing shops must mold for two or three days before pouring off. With hot blast, they can pour continuously at the lower rate of production. The foundry can give better service and

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Tuff Tite advantages include ease and economy of installation, surface protection and vibration resistance. Standard items are immediately available from jobbers and warehouses. Tuff Tites are also available in numerous special designs to suit any application need.

If you are joining metal, plastic, porcelain or asbestos, you should know about Townsend Tuff Tites. Your Townsend representative will be glad to discuss them with you, or we will send you complete literature. Townsend Company, P. O. Box 237-C, New Brighton, Pa.

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BETTER CASTINGS . . .

avoid the deterioration that takes place in standing molds.

Better Quality — The iron contains less sulfur because less coke is used in the bed and with each metal charge. Superior reduced its bed height from 70 to 55 in. (4800 to 3400 lb). Coke savings have ranged from 15 to 30 per cent, depending on the production level. The coke ratio with the cold blast was 7.5:1. It's now 10:1 and higher.

The System — Superior uses a preheat temperature of 450° F. Its hot blast system is an externally gas fired unit made by Fabricating Engineering Co. Inc., York, Pa. Its capacity is 7000 cfm. (Other systems are described in STEEL, Mar. 11, 1957, pp. 159-160.)

Superior melts with two Whiting No. 8 cupolas that have standard windboxes. Air enters the cupola through cast iron tuyeres. The cupola windbox and the pipe from the preheater to the cupola are insulated. Except for changing slag removal from back to front, no modifications have been made in the construction or lining of the cupolas.

Air is supplied by an Ingersoll-Rand centrifugal blower with a capacity of 6500 cfm against a 28-ounce head. A Roots-Connersville positive pressure blower with a capacity of 7000 cfm is for emergency and standby use. Pushbuttons direct the heated air from either blower to either cupola.

Its Operation — The hot blast charge includes 35 per cent low phosphorus bessemer pig iron and 20 per cent steel scrap. The rest of the charge is made of purchased cast scrap and returns. When the cold blast was used, the charge included 40 to 42.5 per cent pig iron and 12.5 to 15 per cent steel, with the rest being cast scrap and returns.

The new system saves 5 lb of ferrosilicon, 10 lb of silicon carbide, and 12 lb of graphite briquets per ton of charge. Physical properties have greater uniformity and few changes are needed to keep the chemical analysis in range.

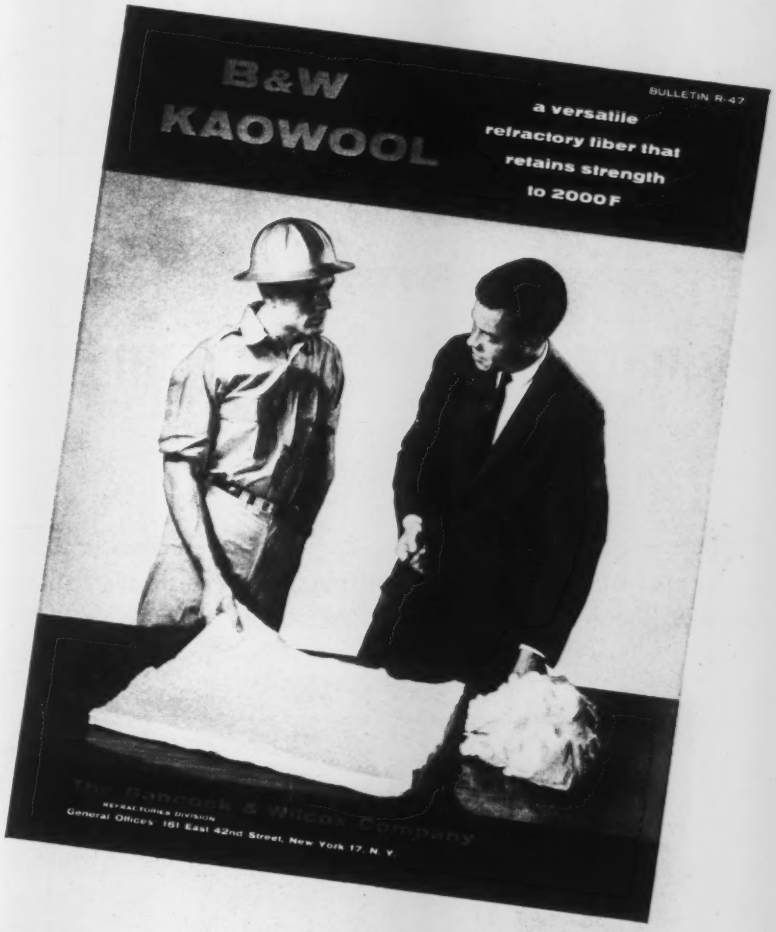
With the cold blast, bridging was a problem, and the tuyeres had to be poked clean of slag every 2 hours. Both conditions have been eliminated.

New Bulletin on

B&W KAOWOOL

Gives data on many uses of 2000 F refractory ceramic fiber

B&W Kaowool, the 2000 F refractory fiber, is being successfully used for expansion joints in walls, roofs, around burners and in car tops of ferrous and non-ferrous heating furnaces. B&W Kaowool blankets are also serving as insulation in the pre-heating and stress relieving of large welded units. Write for new bulletin giving helpful data on B&W Kaowool, the multi-purpose ceramic fiber that withstands high temperature service.



B&W REFRACTORIES PRODUCTS:
B&W Allmul Firebrick • B&W 80 Firebrick • B&W Junior Firebrick • B&W Insulating Firebrick • B&W Refractory Castables, Plastics and Mortars • B&W Silicon Carbide • B&W Ramming Mixes • B&W Kaowool

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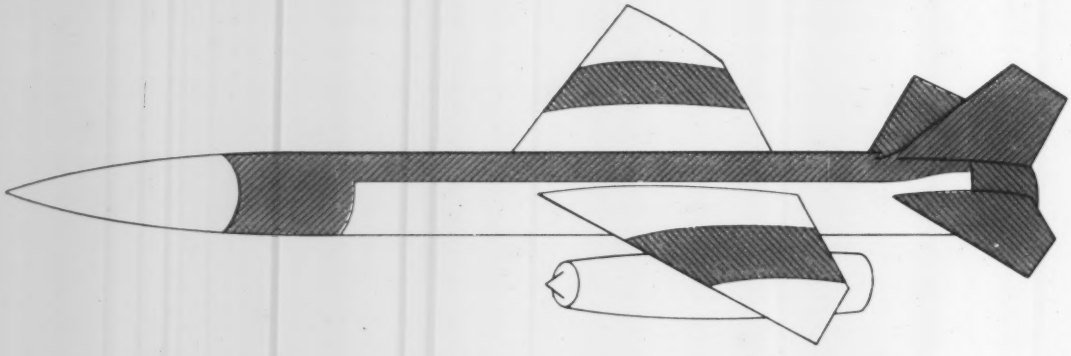


Magnesium-thorium sheet in the Air Force's Bomarc missile is shown in color. Magnesium extrusions are used for leading and trailing edges of control surfaces. The airframe contains several magnesium-thorium castings

Bomarc Uses Magnesium-Thorium Alloys

Engineers at Boeing Airplane Co. say the materials offer the combination of lightness, stiffness, and resistance to heat needed in the pilotless, aircraft-type missile

VOLUME production of the Air Force's Bomarc, a surface-to-air missile, marks the first large-scale application of the new heat resistant magnesium-thorium alloys.

Built by Boeing Airplane Co., the 7500-lb missile makes extensive use of magnesium-thorium sheets, extrusions, and castings to trim weight and withstand the high temperatures created by its 2000 mph speed.

Where It's Used — Magnesium-thorium (HK31 alloy) sheets form 46 per cent of the upper wing surface and 32 per cent of the lower wing surface. It's used entirely for these parts: Upper and lower elevator skins and doublers, upper and lower skins of elevator stubs, fins and rudder skins and doublers.

Boeing engineers report they chose the magnesium alloy for those areas because it offered "the best combination of lightness, stiffness, and resistance to heat." The material also obviated a "potential panel flutter problem in skin panels between the missile's ribs."

Saves Weight—The sheet alloy also forms the aft section of the body monocoque. This section houses the rocket and rocket-support structure. The design goal here was a light structure stiff enough to resist buckling from longitudinal loads induced by the launcher. Retention of mechanical properties at elevated temperature also was mandatory. Weight saving over the original structure was 17 lb.

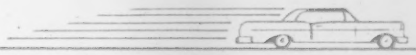
The nose section skin and doors were designed for magnesium-thorium sheets primarily to save 9.5 lb over the initial design.

Extrusions, Castings—Magnesium HM31 alloy extrusions are used for leading and trailing edges of all Bomarc control surfaces. The potential design problem here was supersonic flutter. The magnesium-thorium extrusions did the job, and at 14.64 lb were 8 lb lighter than the material originally considered.

Several HK31 sand castings were designed into the airframe for temperature resistance and weight saving. A doorframe and equipment-mounting structure in the aft body cast from the alloy saved 6 lb over the casting it replaced.

Magnesium-thorium alloys, introduced by Dow Chemical Co., Midland, Mich., also are used on the Navy's Vanguard launching vehicle, on the Air Force's supersonic B-58 Hustler, and are programmed for use on several missiles in the IRBM or ICBM class.

USE FINKL DIE BLOCKS FOR QUALITY FORGINGS



... the automotive industry does!

An upstate New York forge shop specializes in the forging of crankshafts, knuckles, and other high production items used in automotive production. Because the volume of each particular forging is very high, it is possible to evaluate costs and study tooling very closely.

In the illustration above, the manufacturer is using Durodi for both the blocking and finishing crankshaft impressions in this forging press operation.

Durodi, made by Finkl electric furnace quality steel practice is a high volume producer and a most practical hot work tool for close die forgings. It hardens deeply and uniformly, is resistant to abrasion and withstands both shock and impact loading at high hardness. Its Special Machining Quality also appreciably reduces sinking time. All of these advantages mean more production at less cost.

Finkl die blocks are available in several grades, all sizes and tempers to handle virtually any forging requirement. Call your local Finkl representative next time you are considering die blocks or forgings. He will be glad to help you and there is no obligation.

HOT WORK STEELS · DIE BLOCKS · FORGINGS · ELECTRIC FURNACE STEELS

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Highway building across the country ...*is sped by an electric arc*

All over the nation, you can see vast new roads being built. Rugged machines dig . . . scrape . . . haul . . . dump . . . to make your superhighway take shape.

Producing road-building machines involves special problems for their makers. Here, LINDE lends a hand. With UNIONARC welding equipment, heavy steel sections are joined with joint areas stronger than the steel itself.

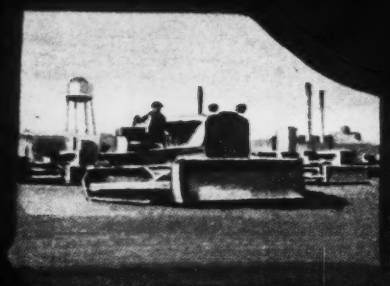
Each of LINDE's different welding methods is designed for certain types of jobs. One is for joining metals that ordinarily are difficult to weld. Another gives sound seams in very thick steel. UNIONARC welding, a method recently developed by LINDE, permits welding down-hand, vertically, or overhead—with savings up to 50%.

For half a century, LINDE has been engaged in research, development, and production of welding machines and methods, for both gas and electric operation. For information on UNIONARC, and a copy of the booklet, "Modern Methods of Joining Metals," write or call your nearest LINDE office.

LINDE COMPANY, Division of Union Carbide Corporation, 30 East 42nd Street, New York 17, N. Y. *In Canada:* Linde Company, Division of Union Carbide Canada Limited.

For the best in electric welding—look to LINDE!

The terms "LINDE," "UNIONARC," and "UNION CARBIDE" are trade-marks of Union Carbide Corporation.



Linde

TRADE MARK

UNION CARBIDE

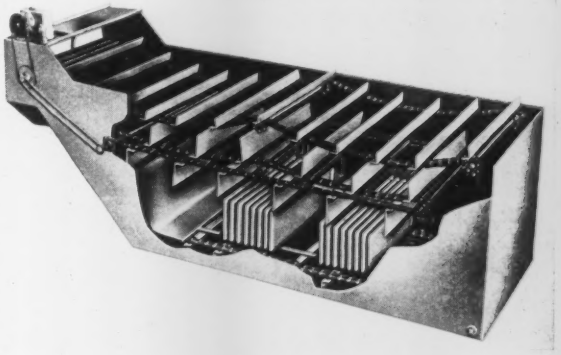
Electric arc welding methods developed by LINDE are used to help make tough and durable road-building machines for building the nation's highways.

Dual Manifold, Continuous Air Filter Is Self-Cleaning

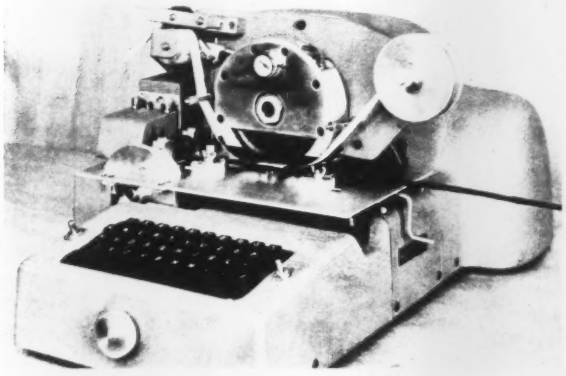
This dual manifold filter decreases unit size by use of leaf design filter elements. It features self-cleaning, opposite cycling of manifolds. While one manifold filters, the other is backwashed for cleaning.

The unit shown has an additional set of skimmer flights for removal of foam created by extremely fine particle suspension. It is ideally suited for filtration of water from wet dust collectors and other high solid content liquids. An automatic control panel permits a wide latitude in all filter operations.

Units are available in flow capacities of 5-1000 gpm of water. Higher capacities are handled by using multiple units. *Write*: Dept. CF-297, Industrial Filtration Co., Lebanon, Ind. *Phone*: 1877



Keyboard Operated Machine Marks Wire and Tubing



The Automark is designed to save time and speed marking operations. It brands tubing from 1/16 to ½ in. in diameter and wire up to 18 gage.

Wire or tubing is fed from coil stock into the unit and passes through the marking station. As the information desired is typed, the stock is automatically fed through and spaced.

The branding head is thermostatically controlled as high as 800° F. Pressure remains constant when set.

A foil feed is incorporated in the machine and foil guides assure proper location when marking.

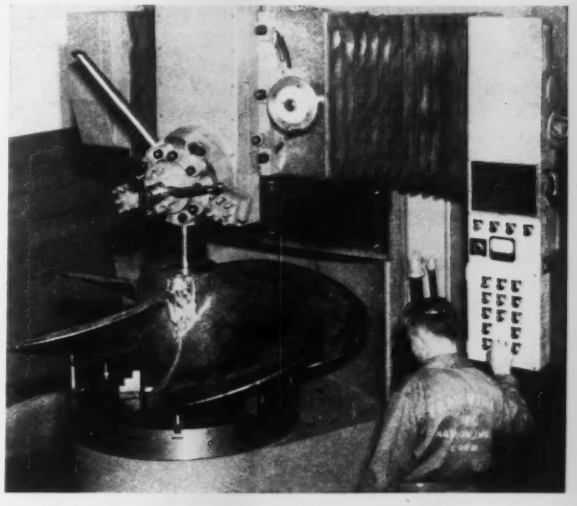
An adjustable cutoff mechanism operates manually or automatically. *Write*: Defiance Machine & Tool Co., 1920 S. Vandeventer Ave., St. Louis 10, Mo. *Phone*: Prospect 3-0567

Vertical Turner and Borer Has Large Capacity

Designed for machining propellers, this machine can do a variety of large diameter work. It features a swing of 72 in. and complete pushbutton control of all major functions. The 42 in. diameter, three-jaw, combination chuck is mounted on a heavy duty spindle driven by a 15-hp direct current motor coupled through a right angle reducer and a timing belt drive. A potentiometer controls spindle speeds from 10 to 230 rpm.

Horizontal and vertical feed, and rapid traverse are electric clutch controlled. The feed system uses a ball bearing screw for horizontal movements and a ball bearing screw geared to a ball bearing spline for the vertical movements. Feed rates of 0.002 to 0.030 per table revolution are controlled by a potentiometer.

The vertical slide has a five-position turret with 24-in. travel. The cross slide can be fed from 24 in. right to 6 in. beyond table center. *Write*: Fraunthal Div., Kaydon Engineering Corp., Muskegon, Mich. *Phone*: 5-1641

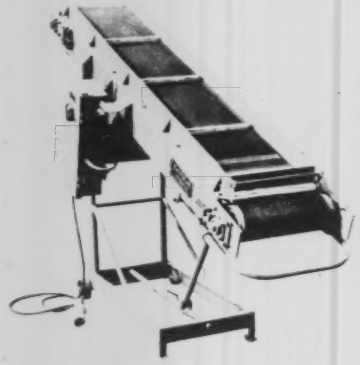


NEW PRODUCTS and equipment

Portable Conveyor

The Hustler is an adjustable conveyor for moving heavy metal stampings between presses, as well as for the mechanized handling of all types of heavy parts and assemblies.

A positive locking device permits adjustment of the working height. The conveyor pitch can be adjusted for any angle up to 45 degrees from the horizontal.



Two wheels make it easy to move the unit from job to job. While the conveyor is in use, a floor lock or blocks are not needed.

Various lengths, widths, and belts are available. *Write*: May-Fran Engineering Inc., 1725 Clarkstone Rd., Cleveland 12, Ohio. *Phone*: Kenmore 1-2304

Motor Frame Drill

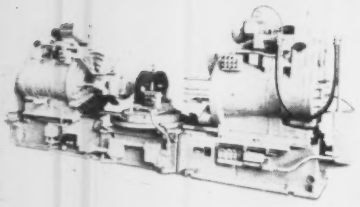
A four-position index table and two adjustable multiple-spindle heads speed drilling and tapping Size 360 through 500 electric motor frames and brackets.

The index table has four bushed holes for use in locating fixtures, T-slots for bolting them down, and a revolving air connection through the table center for fixture air clamping.

The left-hand head is a driller only and is provided with a step drilling attachment, automatic time delay reverse, and remote setup control.

The right-hand head is used as both driller and tapper with hydraulic feed and has the same attachments as the left-hand head.

Both of these 26 in. round heads



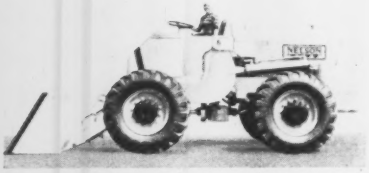
have special cluster plates and nose adjusting, arm type spindles so that a bolt circle of up to 24⅛ in. diameter can be drilled or tapped. These spindles allow for preset tooling.

An interference bar between the heads keeps the tools from clashing when drilling brackets. *Write*: National Automatic Tool Co., Inc., Richmond, Ind. *Phone*: 2-1183

Tractor-Shovel

Model 200, a 2¼ cu yd capacity unit for heavy work, features underslung arms. It has good operator visibility and safety. Nothing protrudes past the operator's cockpit.

The bucket has a 40-degree tipback. Maximum dumping height is 9 ft 6 in. The forward reach is 5 ft 7 in. at a dumping height of 7 ft.



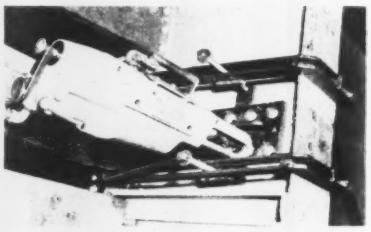
It has a full reversing transmission, four-wheel drive, and is powered by a 117-hp Continental M-363 gasoline engine or a GM 3-71 diesel. The gasoline model weighs 19,500 lb, the diesel 20,000 lb. *Write*: N. P. Nelson Iron Works, 850 Bloomfield Ave., Clifton, N. J. *Phone*: Prescott 9-6780

Drill Is Portable

The Buckeye-Matic, a mechanical feed, automatic drill combines machine tool precision with portable tool convenience. It is adaptable to drilling, reaming, boring, counterboring, and countersinking. Accuracy and sharp breakthrough are assured even on the toughest materials, including many alloy steels heat treated to 48-54 Rockwell C.

This tool goes through the complete drilling cycle, including retraction and stopping, automatically.

Rated capacity is 1½ in. in steel and larger in softer materials. Maximum stroke of 6 in. can be adjusted downward by a micrometer screw. A mechanical feed insures forward progress as long as the drill rotates. This is essential in automatic drilling as many metals will



work-harden if heated by a twist drill which turns without cutting. If the spindle becomes overloaded, the retraction and shutoff cycle is automatic. *Write*: Buckeye Tools Corp., Springboro Pike, Dayton, Ohio. *Phone*: Axminster 8-5281

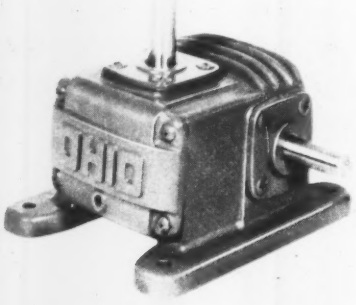
Overload Protector

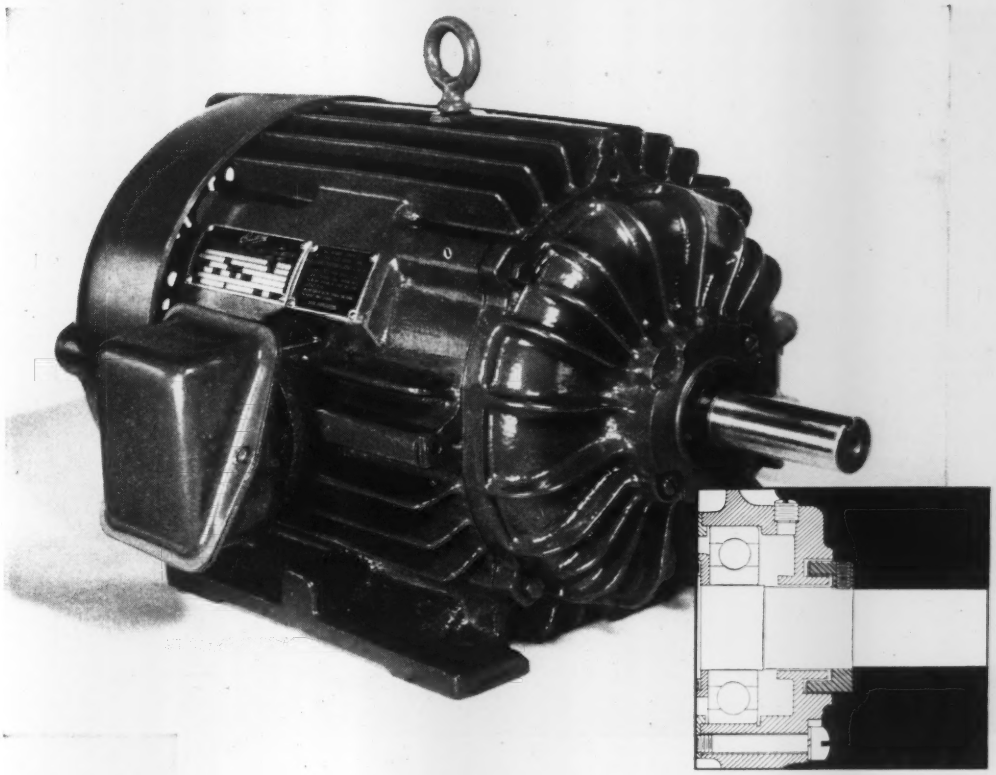
Instantaneous jam protection panels take the place of shear pins and other forms of machine protection. They have a fast operating cycle and power is locked out until jam is cleared. Pressing a button resets the protection device. *Write*: Palmer-Bee Co., Opdyke Road at G.T.R.R., Bloomfield Hills, Mich. *Phone*: Midwest 7-0400

Speed Reducers

Series 20 uses fins for cooling. Models include both horizontal and vertical output shafts. The right angle drive units have a single worm gear reduction.

The reducers have a small size to capacity ratio. They are designed





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TOTALLY ENCLOSED FAN COOLED MOTORS

When motor maintenance goes down, production goes up. Century TEFC Motor *protects itself* from dust, grit, chemical fumes, moisture. Shaft openings at each end are labyrinth-sealed, and there is a precision clearance between metal seal and bearing bracket.

Outside, a hose or whisk broom quickly cleans it. External fan forces jets of cooling air across the frame. Inside, vital motor parts are completely sealed off from injurious atmosphere. Factory lubrication of bearings is adequate for several years' service under normal conditions; however, whenever required bearings may be relubricated through grease plugs.

For full facts on your specific application, call the Century District Office or Authorized Distributor nearest you.

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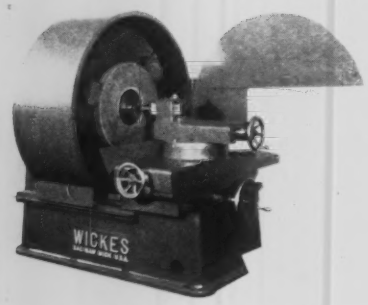
for use with motors up to 1.5 hp.

Output horsepower and torque vary with speed and input horsepower. Ratios range from 9:1 to 58:1. *Write*: Ohio Gear Co., 1400 E. 179th St., Cleveland 10, Ohio. *Phone*: Kenmore 1-0607

Save Grinding Wheels

All types of grinding wheels from 8 to 42 in. in diameter and up to 14 in. thick can now be salvaged. This machine also sizes new grinding wheels for specific requirements and can re-establish the wheel's bore. It is powered by a 7½-hp motor via V-belts. The spindle speed is variable from 125 to 500 rpm.

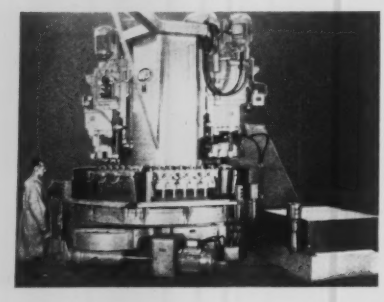


Safety features include a guard and ducting for plant dust collecting systems. *Write*: Machine Tool Div., Wickes Corp., 515 Washington, Saginaw, Mich. *Phone*: Pleasant 2-6126

Center Column Machine

Forged steel connecting rods are produced at a rate of about 435 an hour by two machines which work in series. The machines are 100 in. in diameter and have six positions.

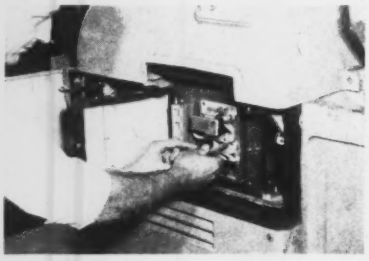
The first machine, STA-521, drills, core drills, chamfers, and reams the piston pin holes. Then the parts are sawed to produce rods and caps.



On the second machine, STA-522, the two holes for attaching the caps to the rods are drilled, chamfered, and reamed. *Write*: National Automatic Tool Co. Inc., Richmond, Ind. *Phone*: 2-1183

Tape Control

A tape unit for the Potter & Johnston 3U, 4U, 6DRE40, 8U, and 10U precision turret lathes is now available.



It is capable of starting, stopping, rapid traverse, and speed and feed changes of the spindle, turret, and cross slides. *Write*: Potter & Johnston Co., Pawtucket, R. I. *Phone*: Pawtucket 5-6500

Lining Material

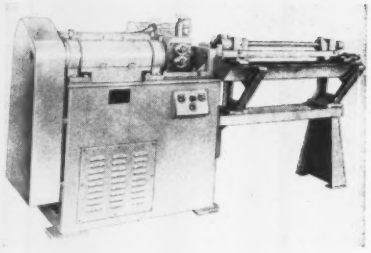
Vyflex Fligid, a lining material, resists a large number of corrosive chemicals.

Produced in continuous sheets, it consists of unplasticized polyvinyl chloride, which can be chemically bonded to the base materials.

Joints between individual panels or sections of the lining can be gas welded with a filler rod or strip of the same material to assure a homogeneous surface. *Write*: Equipment Div., Wagner Bros. Inc., Detroit, Mich. *Phone*: Tulsa 3-0100

Wire Straightener

The Shuster 2AV variable speed, automatic wire straightening and cutting machine handles wire diameters from 1/16 to 5/16 in. It has a high speed straightening arbor with five elongated split dies mounted on ball bearings for minimum vibration. Reeves variable speed units provide feed ranges from 50 to 200 fpm. An electric control panel allows one-position operation. *Write*: Mettler Machine Tool Inc., Adeline and Boulevard, New Haven, Conn. *Phone*: Locust 2-3178

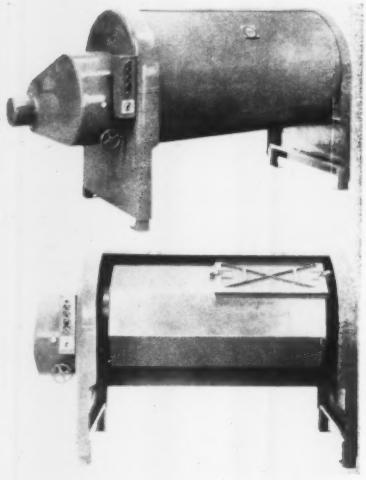


Barrel Finishing

The No. 30 Series includes 15 machines with capacities from 5 to 25 cu ft. The variable speed V-belt system minimizes shock and vibration.

Both the cylinder opening and the door have sealing surfaces which are vulcanize-molded to prevent leaks.

Pushbutton controls allow the operator to inch the cylinder forward or backward during loading and unloading.



Doors have no ledges to catch media or parts. *Write*: Crandall Engineering & Mfg. Inc., P. O. Box 291, Vicksburg, Mich. *Phone*: Midway 9-4331

Cutting Unit

The Campbell Model 28 Severall, dry abrasive cutting unit provides high cutting capacity over a wide range of materials.

Equipped with a heavy duty motor (10 hp at 3600 rpm) which provides a spindle speed of 2450 rpm,

Claymont's 160-inch plate mill in action. Fully integrated steel producing facilities and a complete range of fabricating equipment make Claymont a reliable source of quality steel plate and plate products for industry.

Photo by d'Arazien

CLAYMONT STEEL PLATES

CF&I

CHECK CLAYMONT FOR—Alloy Steel Plates • Carbon Steel Plates • Stainless-Clad Steel Plates High Strength Low Alloy Steel Plates • CF&I Lectro-Clad Nickel Plated Steel Plates • Pressed and Spun Steel Heads • Manhole Fittings and Covers • Fabricated Steel Products Large Diameter Welded Steel Pipe

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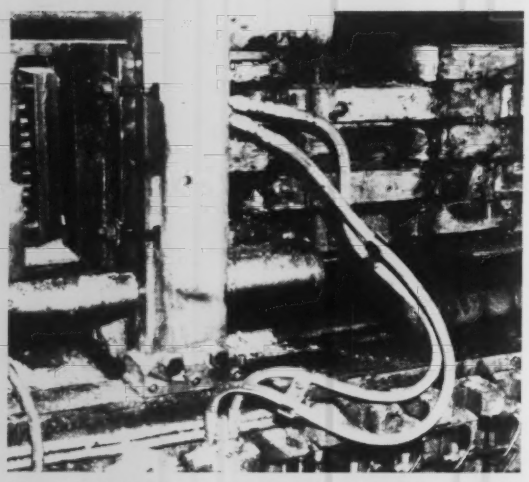
5746

Select The Right Kind Of Hose For The Fire-Resistant Hydraulic Fluid You Use



Aeroquip 1546 Hose Lines convey fire-resistant hydraulic fluids on this die-casting machine.

AEROQUIP OFFERS A FULL RANGE OF HYDRAULIC HOSE AND REUSABLE FITTINGS FOR ALL FLUIDS

Fire-resistant hydraulic fluids, whether water-base or phosphate-ester base, offer safety and reliability in "hot spot" hydraulic systems. Yet, these two major types of fluids are not interchangeable.

For hydrolubes such as Ucon and Houghto-Safe 620, Aeroquip 1508, 1509 or 1503 Hose and Reusable Fittings are recommended.

When phosphate-ester base fluids like Cellulube, Pydraul F-9 and Houghto-Safe 1020 are used, Aeroquip 2756, 1546 or 1532 Hose and Reusable Fittings should be used. In addition to using one of these hose lines, it is recommended that compatible polymeric seals and packings also be used throughout the hydraulic system.

Check the chart below for the hydraulic hose type you need. Then call the Aeroquip Distributor listed in your Yellow Page Phone Book, or write us for full information.

FOR HYDROLUBE FLUIDS	FOR PHOSPHATE-ESTER FLUIDS
Aeroquip 1508 Multiple Spiral Wire Wrap Hose for high pressure hydraulic systems operating up to 5000 psi. Temperature range —40 F. to +200 F. In ⅜", ½", ¾" and 1" O.D. tube sizes.	**Aeroquip 2756 Multiple Spiral Wrap Hose** for phosphate-ester hydraulic systems with high operating pressures to 5000 psi. Temperature range —40 F. to +200 F. In ⅜" through 1" sizes.
Aeroquip 1509 Double Wire Braid Hose for high pressure hydraulic systems ranging up to 5000 psi., depending on hose size. Temperature range —40 F. to +200 F. In sizes from ¼" through 2".	**Aeroquip 1546 Double Wire Braid Hose** for phosphate-ester hydraulic systems up to 5000 psi., depending on hose size. Temperature range —40 F. to +200 F. In sizes from ¼" through 2".
Aeroquip 1503 and 1502 Single Wire Braid Hose for medium pressure hydraulic systems up to 3000 psi., depending on hose size. Temperature range —40 F. to +275 F. In O.D. tube sizes from ¼" through 3".	**Aeroquip 1532 Single Wire Braid Hose** for phosphate-ester hydraulic systems up to 3000 psi., depending on hose size. Temperature range —40 F. to +250 F. In O.D. tube sizes from ¼" through 2".

Aeroquip

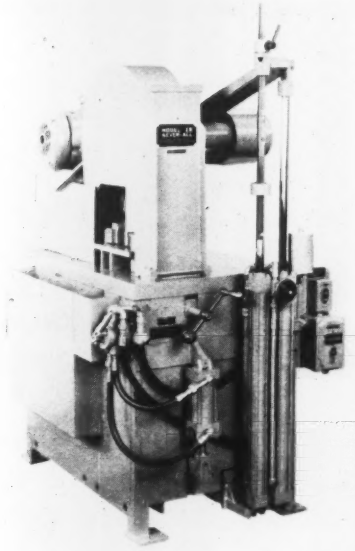
REG. TRADEMARK

AEROQUIP CORPORATION, JACKSON, MICHIGAN

INDUSTRIAL DIVISION, VAN WERT, OHIO • WESTERN DIVISION, BURBANK, CALIFORNIA

AEROQUIP (CANADA) LTD., TORONTO 19, ONTARIO

LOCAL REPRESENTATIVES IN PRINCIPAL CITIES IN U.S.A. AND ABROAD • AEROQUIP PRODUCTS ARE FULLY PROTECTED BY PATENTS IN U.S.A. AND ABROAD

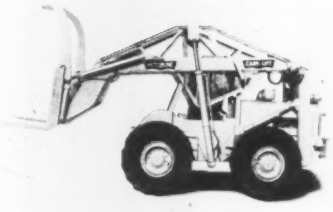


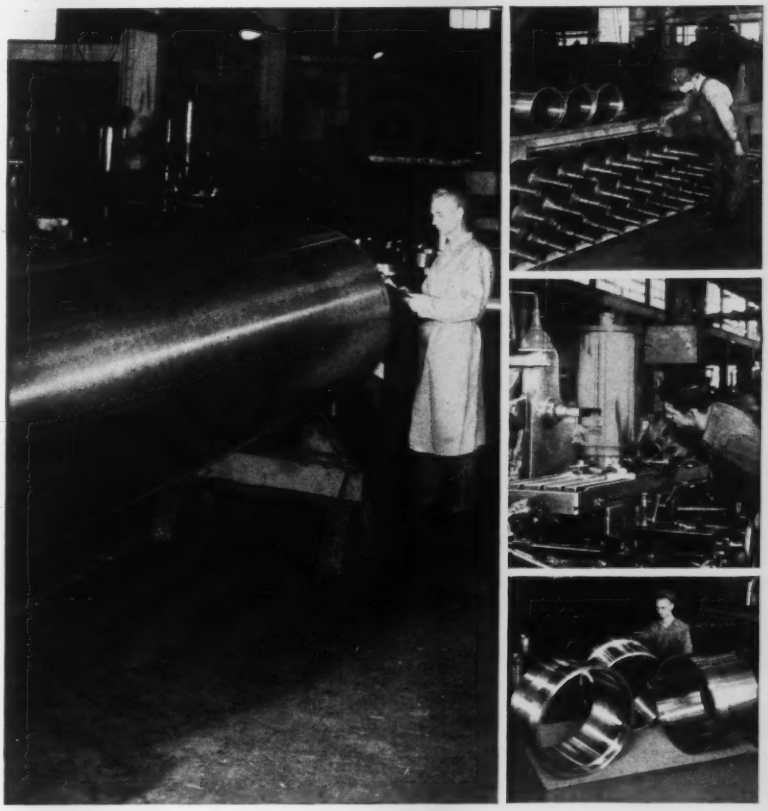
the unit will handle solid steels up to 4 in. square, 6-in. angles, 8-in. channels, and 4-in. OD pipe or tubing at 90 degrees to axis. It will sever a variety of materials ranging from aluminum to hardened steels.

In both stationary and portable models, it measures 56 in. deep, 32 in. wide, and 62 in. high. Net weight with electrical equipment and accessories is approximately 1200 lb. *Write*: American Chain & Cable Co. Inc., 929 Connecticut Ave., Bridgeport 2, Conn. *Phone*: 7313

Fork Lift Truck

The Super 20 Cary-Lift offers as standard equipment an automatic transmission, four-wheel power brakes, power steering, and hydraulic shock absorbers for lift cylinders. It has a 20,000-lb capacity, a 4-ft reach at any fork height, and a maximum loading height of 14½ ft. The hydraulic tilting forks have a range of 27 degrees up to 81 degrees down. The truck is





You'll find them better for pressure if they're

SHENANGO CENTRIFUGAL CASTINGS

WHATEVER the inside or outside pressures, Shenango centrifugal castings are better able to withstand them without failure.

Parts cast by the Shenango centrifugal process are much tougher because their finer, *pressure-dense* grain avoids stress concentrations while providing greater strength, better elongation and freedom from such costly defects as sand inclusions, blowholes and such.

Whether you need rings, rolls, sleeves, liners, bushings, bearings, mandrels or *any* annular or symmetrical part . . . ferrous or non-ferrous . . . in whatever shape, size or dimension to meet your requirements . . . Shenango can do the job. And do the job *better!*

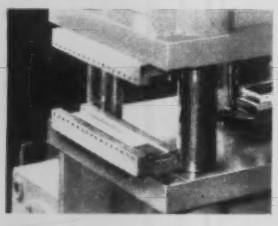
For informative bulletins on the answers to your tough problems, it will pay you to write now to: *Centrifugally Cast Products Division,* The Shenango Furnace Company, Dover, O.

SHENANGO CENTRIFUGAL CASTINGS

COPPER, TIN, LEAD, ZINC BRONZES • ALUMINUM AND MANGANESE BRONZES
MONEL METAL • NI-RESIST • MEEHANITE® METAL • ALLOY IRONS

Case History No. 12

E. H. Titchener & Co. Binghamton, N.Y.



This close-up shows how the E. H. Titchener & Co. uses the 3" x 24" slide and platen outboards to install breaking dies and use them without affecting the normal working area of the press.

VERSATILE, MULTI-PURPOSE PRESS SOLVES PROBLEM FOR E. H. TITCHENER & CO.

"Give us a die tryout press which incorporates critical tolerances, provides a wide range of versatility and, if possible, build it to be used for die development and die tryout simultaneously on various units that are independent of each other." This was the problem the E. H. Titchener & Co. gave to R. C. Neal Company, Inc., Wilson's Elmira, N. Y. Dealer. Working closely with Earl H. Kaeselau, Wilson's New York State representative, K. R. Wilson engineers developed and produced this 100 ton capacity down acting, four column hydraulic press designated Model 100S-FM-2424.

In the development of this press, K. R. Wilson engineers came up with this unique feature — 3" x 24" slide and platen outboards were added which permits the Titchener Co. auxiliary working area where conventional tools can be installed and used without affecting the normal work area of the press. This feature makes the press truly versatile, a real multi-purpose press for a wide variety of uses.

SPECIFICATIONS

This press is available in 25 to 500 ton capacity and can be modified to customer's specific requirements.

If you seek a sure, successful solution to a specialized press problem, follow the lead of America's most progressive companies, contact your nearest K. R. Wilson representative, or write direct today.

HYDRAULICS DIVISION

K. R. WILSON, Inc.

Offices & Factories – 216 Main St., Arcade, N.Y., U.S.A.

NEW PRODUCTS and equipment

made for use on smooth plant floors or unpaved yards. *Write*: Pettibone Mulliken Corp., 4710 W. Division St., Chicago 51, Ill. *Phone*: Wabash 2-4580

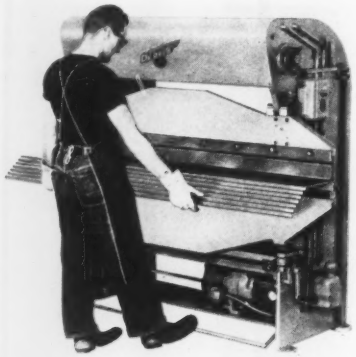
Punch Press

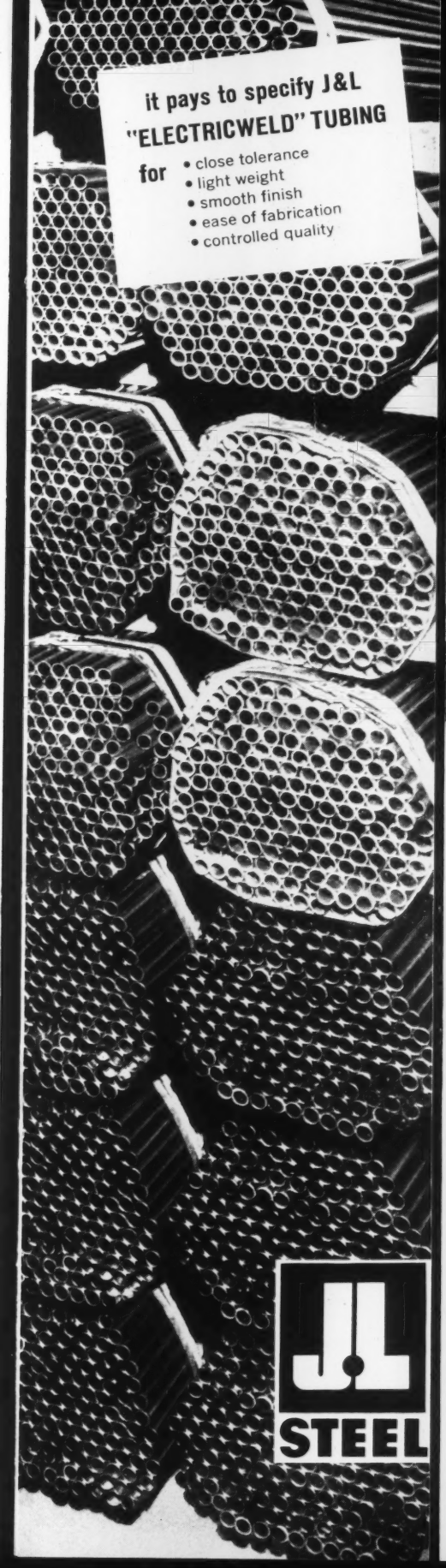
Model B-3 can punch, shear, form, blank, cut, and draw metals and other materials. It is a bench-type machine with a capacity of 3 tons. Up to 300 parts a minute can be produced.

The ram adjustment has a positive lock. Standard stroke is 1 in., but strokes from ¼ to 1½ in. are available. *Write*: Alva Allen Industries, Clinton, Mo. *Phone*: 1286

Press Brake

This hydraulically operated, adjustable stroke press brake (Model 20-72) has a 6 ft bed and a maximum capacity of 20 gage mild steel. Length of stroke is adjustable from ¼ in. to 1½ in. per minute. A re-





"Electricweld tubing gives us greater strength with lighter weight" ...says SHOPSMITH manufacturer

The Magna Power Tool Corporation has been using J&L's light wall tubing for Shopsmith ways since 1947. These twin tube mounts make possible the versatility of these popular multi-purpose home workshops. "Electricweld" precision tubing is used for the rigid straightness to .003" tolerance on diameter. Performance has been so satisfactory that Magna Power Tool Corporation now has eight applications for "Electricweld" tubing.

"Electricweld" tubing may be the answer to *your* design and manufacturing problems. Your nearby J&L representative can recommend the exact shape, size, gage and grade of tubing for your products. He frequently can reduce your costs, improve your product. Call him today, or write for information based on your specific requirements to Jones & Laughlin Steel Corporation, 3 Gateway Center, Pittsburgh 30, Pennsylvania.

Jones & Laughlin Steel Corporation

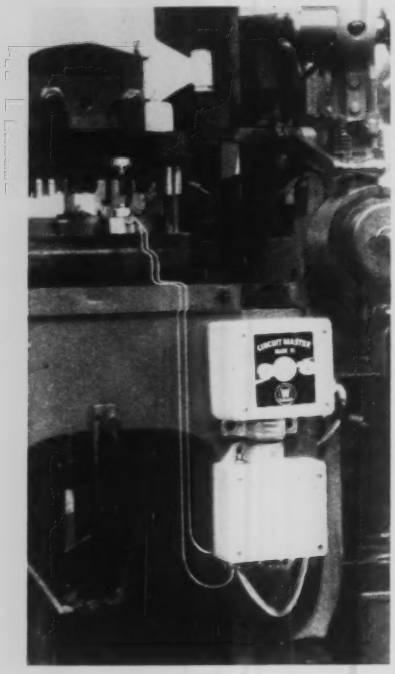
PITTSBURGH, PENNSYLVANIA

lief valve which can be set for the required tonnage and a back gage that can be set both vertically and horizontally are standard equipment.

Standard press brake dies in 6 in. increments from 6 in. to 6 ft are available. *Write*: O'Neil-Irwin Mfg. Co., 619 Eighth Ave., Lake City, Minn.

Overload Detector

The Circuit Master Mark III incorporates an electronic compensator which adjusts for temperature. It automatically shuts down any machine when malfunctions occur.

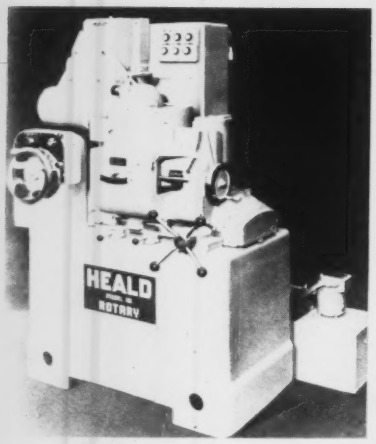


It prevents die damage and costly breakdown. Installation time is less than 1 hour. The unit is easily mounted on any machine. *Write*: Wintriss Inc., 20 Vandem St., New York, N. Y. *Phone*: Chelsea 2-0105

Surface Grinder

Model 161 rotary surface grinder grinds flat, convex, or concave surfaces of work up to 6-in. OD. The column type machine produces finishes of 2 to 4 microinches.

Automatic table reciprocation and a wheelhead drive motor are built into the end of the wheelhead spindle to provide more power for heavy stock removal. *Write*: Heald Machine Co., Worcester 6, Mass.



Press Protector

This Press-Tonnage Limitor is an electromagnetic torque limiting device which protects presses against overloads through the press cycle. It can be crankshaft or backshaft mounted on mechanical presses.

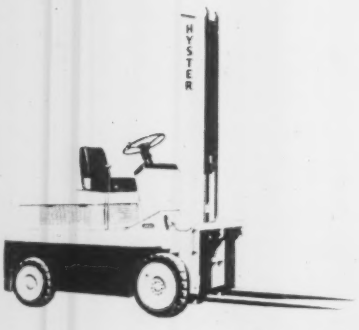
The Limitor follows the press capacity throughout the stroke and functions as a protective kickout by disengaging the crankshaft from the flywheel when the work tonnage exceeds the preset limit.

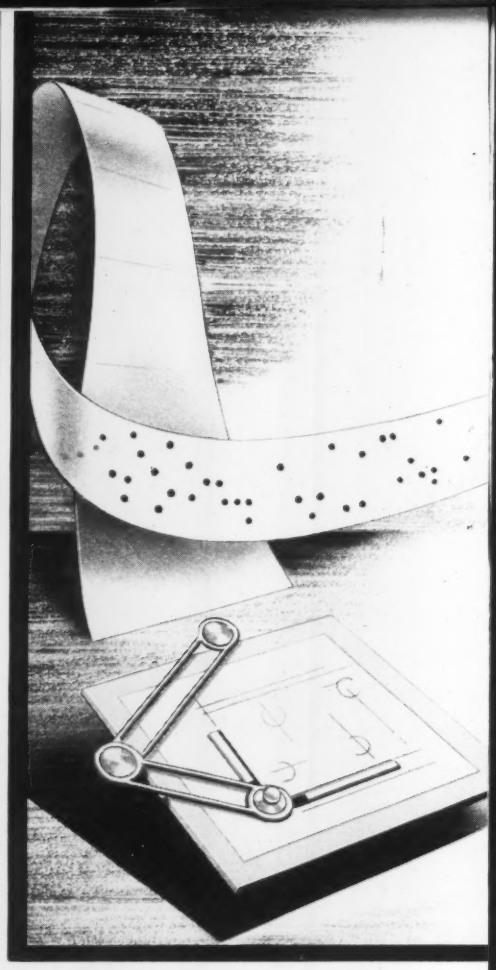
The Limitor can be arranged for electrical or manual resetting in a matter of seconds. Maximum capacity under all conditions may be key-locked by management. *Write*: E. W. Bliss Co., 1375 Raff Rd. S. W., Canton 10, Ohio. *Phone*: Greenwood 7-3421

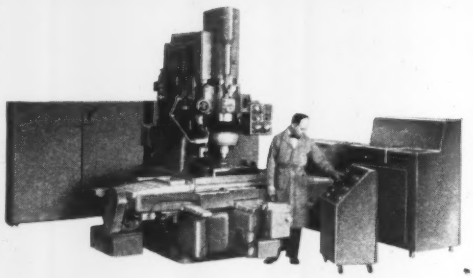
Lift Truck

The Space Saver line of lift trucks features a short over-all length with a long wheelbase.

The 6000, 7000, and 8000 lb







OTHER P&W NUMERICALLY CONTROLLED MACHINE TOOLS

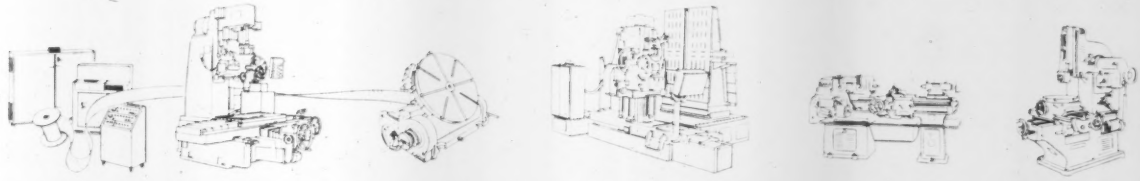
. . . include the No. 2E Vertical Precision Hole Grinder and the 42" Precision Rotary Table.

PRECISION JIG BORING TIME CUT 90% . . .

. . . **WITH P&W NUMERICAL CONTROL!** Precision work put on *predictable* production schedules, completed in as little as 1/10 the time required by previous methods. Costly human errors are eliminated. Positioning accurate to "tenths" absolutely guaranteed. These benefits are reported by Dexter Tool Company of Hazel Park, Michigan, since installing a Pratt & Whitney Numerically Controlled Jig Borer. Dexter produces precision aircraft and automotive components. Work involves 6 to 50 identically machined parts, and it's important to guarantee precision, accurately estimate production time and deliver on schedule. Positioning itself automatically by punched tape, the Numerically Controlled Jig Borer handles "tenths" limits as fast and surely as ordinary work. A Dexter spokesman states, "We think the P&W 2E Numerical is the greatest single improvement in machine tooling. It's the ultimate."

Today, "tenths" limits are common, yet profitable operation demands that you produce faster than ever before. Pratt & Whitney Machine Tools with Numerical Control can provide the right answer for you!

Write now for complete information.
Pratt & Whitney Company, Inc.
13 Charter Oak Boulevard, West Hartford, Conn.



NUMERICAL CONTROL . . . JIG BORERS . . . ROTARY TABLES . . . KELLER MACHINES . . . LATHES . . . VERTICAL SHAPERS

PRATT & WHITNEY

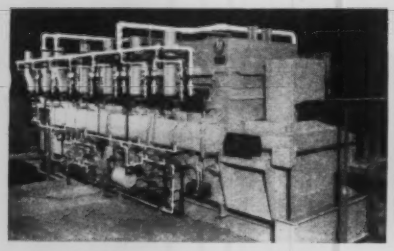
FIRST CHOICE FOR ACCURACY

MACHINE TOOLS • GAGES • CUTTING TOOLS

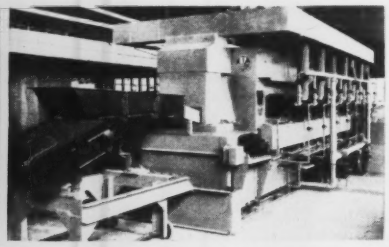
FURNACES

for continuous carbonitriding, carbon correction and scale-free hardening of small parts

175 TO 2000 LBS. PER HOUR



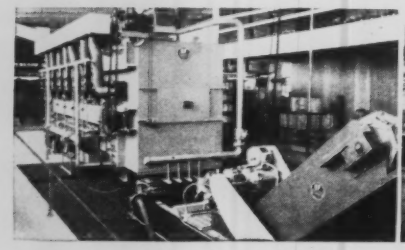
Carbonitriding, Carbon Correction, Carburizing, Scale-free Hardening and other Processes are Handled Uniformly, Economically and Continuously in EF Chain Belt Conveyor Furnaces.



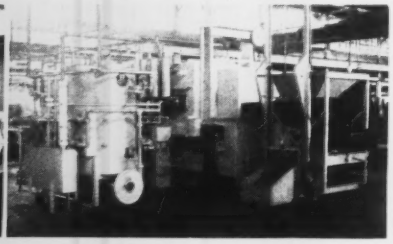
EF Gas Fired Radiant Tube Combination Hardening and Dry Cyaniding Unit Fitted with an Automatic Feeder that Distributes the Parts Evenly on the Chain Belt Conveyor; and a Dual Quench.

The EF chain belt conveyor furnace is one of the most satisfactory continuous heating units yet devised for scale-free hardening, carbon restoration, carbonitriding, carburizing and non-decarb heat treating small and medium size parts. The material is loaded onto our rugged heat resisting cast link conveyor belt; carried through the furnace; heated uniformly to proper temperature; automatically quenched and discharged. No pans or trays are needed. Hundreds in daily operation prove the dependability and efficiency of our design. 11 standard sizes. Capacities to 2000 lbs. or more per hour. Gas, oil or electrically heated. Furnished complete with any desired feeding, discharging or special atmosphere equipment. Write for folders describing our chain belt conveyor type and other production furnaces.

The Conveyorized Partitioned Dual Quench Moves Laterally to Permit either the Complete Oil or the Water Quenching Equipment to be Positioned under the Sealed Furnace Discharge.



This EF Special Atmosphere Unit can Operate as either an Exothermic or Endothermic Generator. Used with EF Continuous Belt Hardening Furnaces for Scale-free Hardening or Carbon Restoration.



ASK FOR BULLETIN 462-CB.

shows typical installations of EF Gas-fired, Oil-fired and Electric Furnaces.

Send for a copy today!

THE ELECTRIC FURNACE CO.

GAS FIRED OIL FIRED AND ELECTRIC FURNACES FOR ANY PROCESS, PRODUCT OR PRODUCTION *Salem - Ohio*

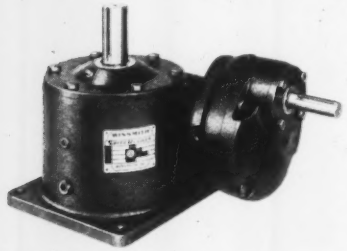
Canadian Associates • CANEFCO, LIMITED • Toronto 1, Canada

NEW PRODUCTS and equipment

capacity units have power steering, power shift, and a 70-hp Continental engine as standard equipment. High underclearance prevents hangup on steep ramps or rough terrain. *Write*: Hyster Co., 1003 Myers St., Danville, Ill. *Phone*: 6-2400

Speed Reducers

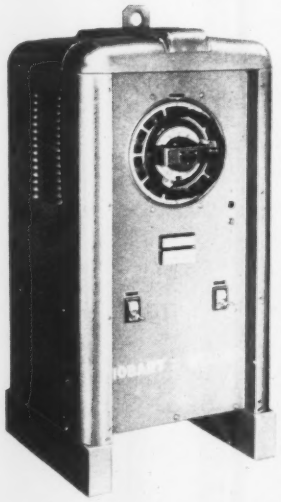
Speed reducers of all types ranging from 1/100 to 85 hp and in ratios from 1.1:1 to 50,000:1 are



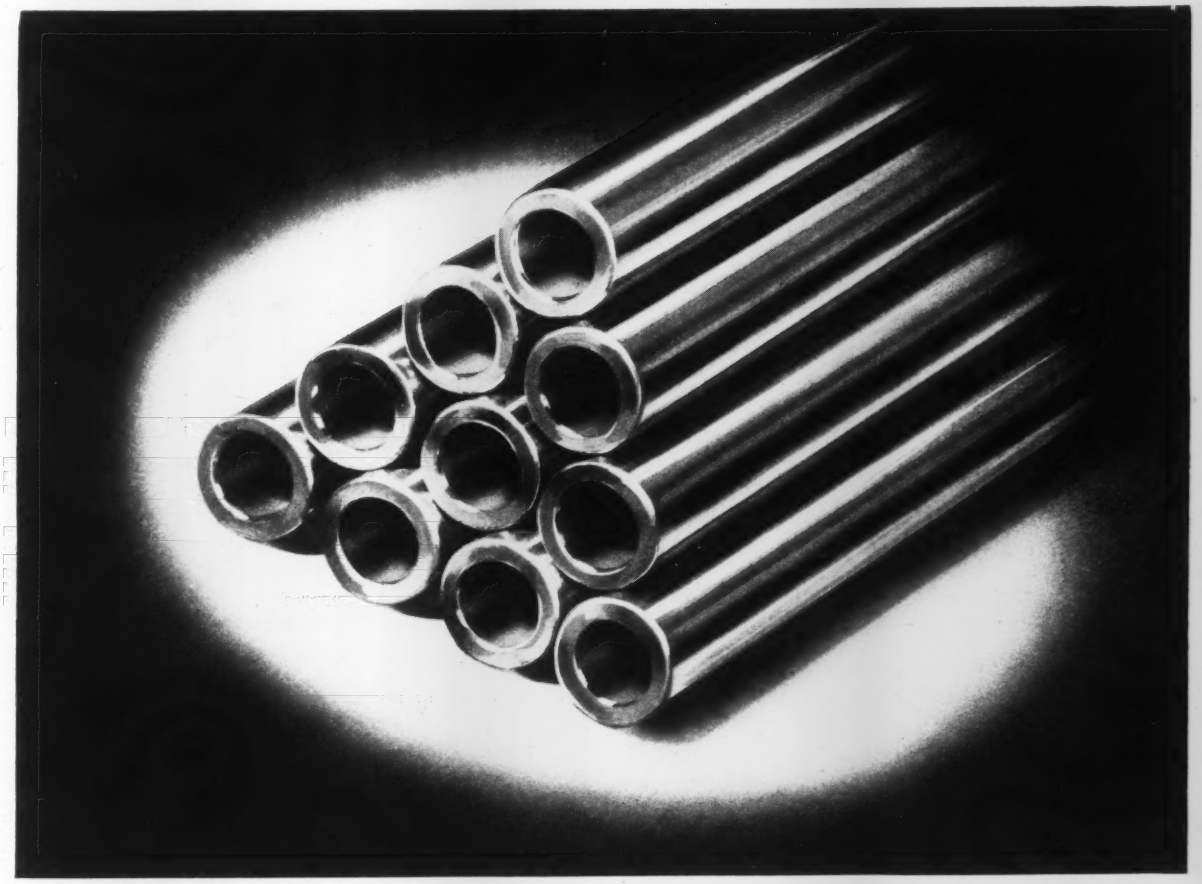
available. *Write:* Winsmith Inc., 95 Eaton St., Springville, Erie County, N. Y.

AC Arc Welder

This transformer type welder has "diverter path" control with five step current adjustments and a rheostat for fine adjustment in each step. There is no high voltage



across any control coil. Three models, covering a range of 35 to 625 amperes at 40 volts, are available. *Write*: Hobart Bros. Co., Troy, Ohio. *Phone*: Federal 2-1223



Typical Bishop Tubing

Look No Further...For QUALITY

Bishop small diameter stainless steel tubing is not surpassed in meeting corrosion, heat, shock, stress and vibration.

It is not excelled in quality of starting stock . . . in accuracy of I.D. and O.D. . . . in dimensional precision . . . in finish.

When quality is of prime importance for hydraulic lines, for aircraft parts, for instruments, for electronics . . . in fact wherever high quality steel tubing is indicated, look to Bishop for the finest . . . at comparable prices.

CAPILLARY, MECHANICAL, HYPODERMIC & AIRCRAFT

Stainless Steel Tubing—seamless and welded and drawn (.008" to 1.000" O.D.)

Nickel and Nickel Alloy Tubing (up to .625" O.D.)

Bent, Flanged, Flared, Milled, Slotted, Swaged, Threaded, etc.

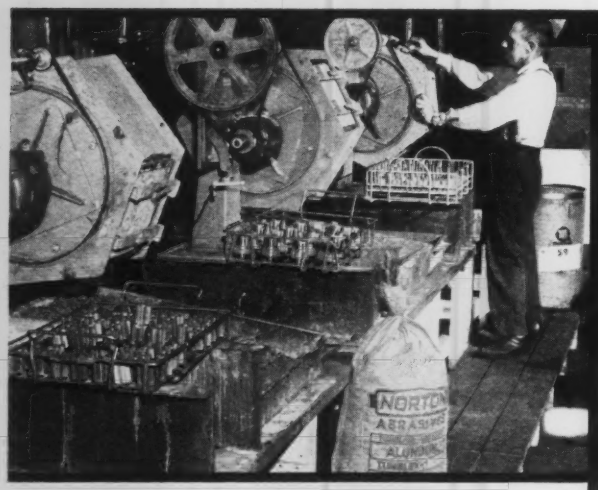
Illustrated Catalog and Prompt Quotations on request

STAINLESS STEEL PRODUCTS DIVISION

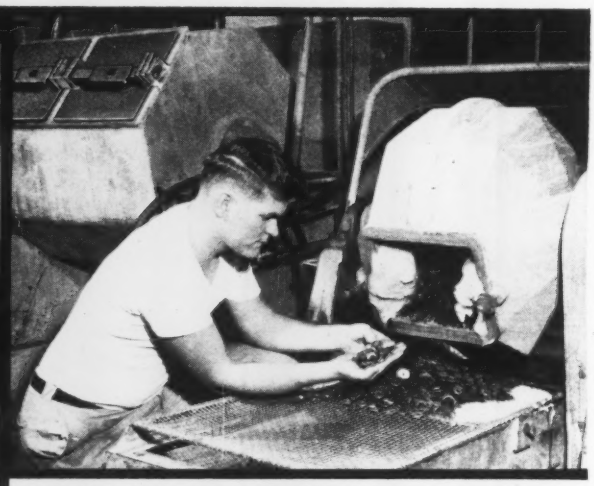
J. BISHOP & CO. Platinum Works

Malvern, Pennsylvania

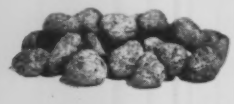
Money savers for all barrel finishing jobs



Small bench barrels with 7 cu. ft. capacity in production line operation. Alundum Tumblex "T" Abrasive is used for finishing irregular shapes.



A 4 cu. ft. capacity production barrel being unloaded after finishing operation. Thirteen cu. ft. production barrel shown in left background.



ALUNDUM* TUMBLEX "A" Abrasive. For general barrel-finishing. Removes flash, scale, tool marks and burrs, while forming radii and finishes to required micro-inches. Seventeen sizes.

ALUNDUM TUMBLEX "T" Abrasive. Bonded, triangular and fast-cutting for special shaped parts. They won't wedge in work slots or holes. Four sizes.

ALUNDUM TUMBLEX "S" Abrasive. Bonded spheres that get into areas where other shapes can't reach. Exceptionally dense and long lasting. Five sizes.

TUMBLEX "N" Abrasive. Natural stones, exclusively Norton. For high lustre, especially on die castings and soft metal. Rounded shape brings up highest lustre. Seven sizes.

For finishing any part . . . in any barrel, large or small . . . there's an exactly right type and size of Norton TUMBLEX abrasive*

For lower costs in deburring, descaling and finishing parts to close tolerances, be sure to choose:

- *The right barrel equipment, available in a wide range of types and sizes.*
- *The right Norton TUMBLEX abrasive — made in four entirely different types, each in many different sizes and each engineered to add the "Touch of Gold" that brings lustre and boosts profits in finishing the widest variety of parts.*

Send samples of parts you finish — large or small, simple or intricate to our Sample Processing Department. We'll barrel finish, return samples, and tell you exactly the methods and abrasives you need to improve product quality and cut costs.

NORTON COMPANY, General Offices, Worcester 6, Mass. Plants and distributors around the world.

*Trade-Mark Reg. U. S. Pat. Off. and Foreign Countries

G338

NORTON

ABRASIVES

Making better products . . . to make your products better

NORTON PRODUCTS

Abrasives • Grinding Wheels • Grinding Machines
Refractories

BEHR-MANNING DIVISION

Coated Abrasives • Sharpening Stones
Pressure-Sensitive Tapes

NEW literature

Write directly to the company for a copy

Cold Rolled Strip

Price comparison charts for flat wire and strip, and a chart giving mill limits, packing procedures, and other practices are given in this publication. Techalloy Co. Inc., Rahns, Pa.

Industrial Water Coolers

Bulletin 106 describes units for cooling diesel or gasoline engines, air compressors, plastic molds, and other closed system applications. Baltimore Aircoil Co. Inc., P. O. Box 7322, Baltimore 27, Md.

Closed Circuit TV

The new Vicon pamphlet, V-1-58, describes cameras, controls, monitors, and accessories for commercial and industrial use. Insul-8-Corp., 1369 Industrial Rd., San Carlos, Calif.

Rider-Walkie Truck

This company's rider-walkie truck line is described and sectionalized views shown. Yale & Towne Mfg. Co., 11000 Roosevelt Blvd., Philadelphia 15, Pa.

Stepladders

A 20-page brochure (No. 158) illustrates 35 new models of stepladders for working heights up to 15 ft. Also shown and described are hydraulic lifts, and fixed or adjustable-level platforms. Ballymore Co., West Chester, Pa.

Compressors

Form E-269 describes the advantages of rotary design compressors. It also contains specifications for compressors and accessories. Industrial Div., Davey Compressor Co., Kent, Ohio.

Transfer Machines

Line and rotary transfer machines and special production milling machines are described in this 12-page bulletin. Producto Machine Co., 990 Housatonic Ave., Bridgeport 1, Conn.

Operators' Guide

A lift truck operators' guide, illustrated and indexed, provides helpful data on lift truck construction, operation and maintenance, as well as handling and stacking techniques. Towmotor Corp., Cleveland, Ohio.

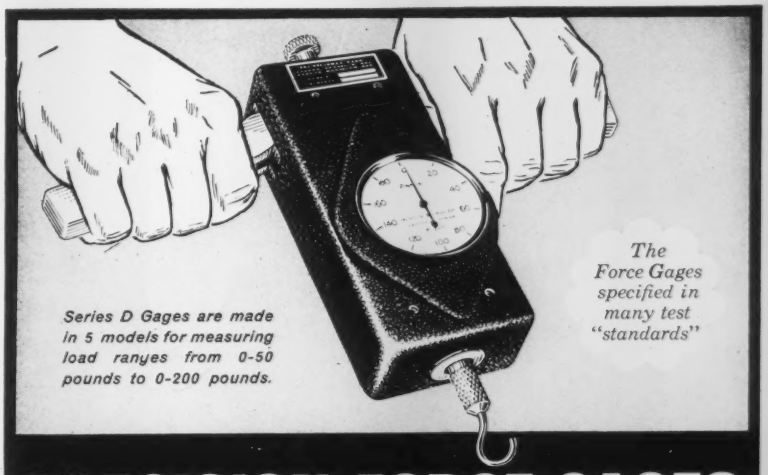
Welding Catalog

A 20-page catalog describes special services, such as engineering and metallurgical aid, as well as products. American Welding & Mfg. Co., Warren, Ohio.

X-Ray Analysis

A bulletin of questions and answers on x-ray diffraction, diffractometry, and spectrography explains specimen preparation

(Please turn to Page 168)

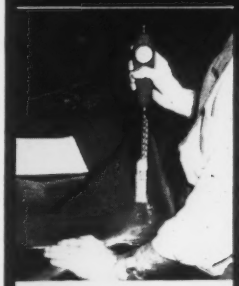


Series D Gages are made in 5 models for measuring load ranges from 0-50 pounds to 0-200 pounds.

The Force Gages specified in many test "standards"

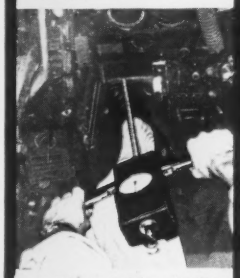
PRECISION FORCE GAGES

for measuring tension and compression loads

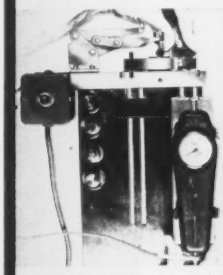


In laboratory, testing bond strength of foil coatings.

Series L Gages are made in 13 models for measuring load ranges from 0-500 grams to 0-30 pounds.



In field, as tool for adjusting aircraft controls.



On production line, determining carbon brush pressure.

Hunter Mechanical Force Gages are precision, direct reading instruments designed for use in inspection departments and laboratories, on production lines, or in the field to measure tension and compression loads. Accurate to within 1% of full scale, they can be hand-held or used in fixtures depending upon use.

The indicator can be made to hold maximum reading until released (no "follower" hand used) or the indicator can be made free moving. Gages are available as noted under illustrations above. Each unit is supplied with six attachments—extension rod, flat knob, notch, hook, cone, and chisel edge—in a compact wood instrument box. Prices are low enough to permit any company to buy one for evaluation. Quantity prices are also offered.

Hunter Bulletin 750c contains full details. Copies are available immediately on request.

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HUNTER SPRING COMPANY

19 Spring Avenue, Lansdale, Pennsylvania

Manufacturers of: Precision Springs, NEG'ATOR® & FLEX'ATOR® Constant-Force Springs, Stampings & Assemblies, Retriever Reels, Force Gages, and Wire Fatigue Testers

FIRST BASIC OXYGEN FURNACES

at Jones & Laughlin use Research-Cottrell Precipitators

Industry's toughest gas cleaning problem. That's how they refer to the job of removing dust from basic oxygen furnace gases. Briefly, here's what's involved:

34 pounds of dust for each ton of blast furnace hot metal. 90% of this dust is less than 1 micron. Dust concentration is about 11 grains per cubic foot. Over 98% guaranteed collection efficiency.

The Research-Cottrell precipitators at Jones & Laughlin Steel Corporation's Aliquippa, Pa., plant are designed to process from 250,000 cfm to 400,000 cfm of the above gases at conditions developing a collection efficiency of 98%.

The diagram and text on the next page explain briefly how Research-Cottrell precipitators fit into the basic oxygen steel making process. If you would like more information on how to insure high dust collection efficiencies—at a low cost—get in touch with your nearest Research-Cottrell representative. Whether your problem involves iron blast furnace, ferro manganese blast furnace, open hearth, sintering or other steel industry applications, you can count on an economical solution to your problems at Research-Cottrell.

Research-Cottrell

RESEARCH-COTTRELL, INC. Main Office and Plant: Bound Brook, N. J. • 405 Lexington Ave., New York 17, N. Y. • Grant Building, Pittsburgh 19, Pa. • 228 N. La Salle St., Chicago 1, Ill. • 58 Sutter Street, San Francisco 4, Calif. • Research-Cottrell (Canada) Ltd., 33 Bloor Street East, Toronto 5, Ontario.

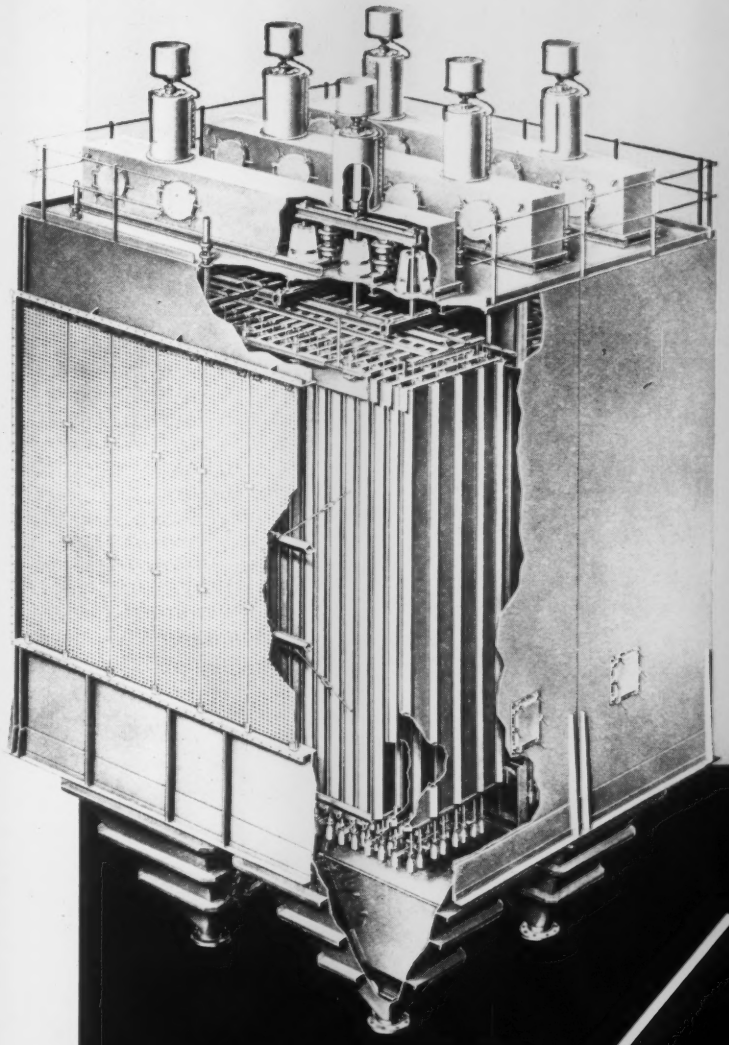
How Research-Cottrell Gets over 98% Collection Efficiency

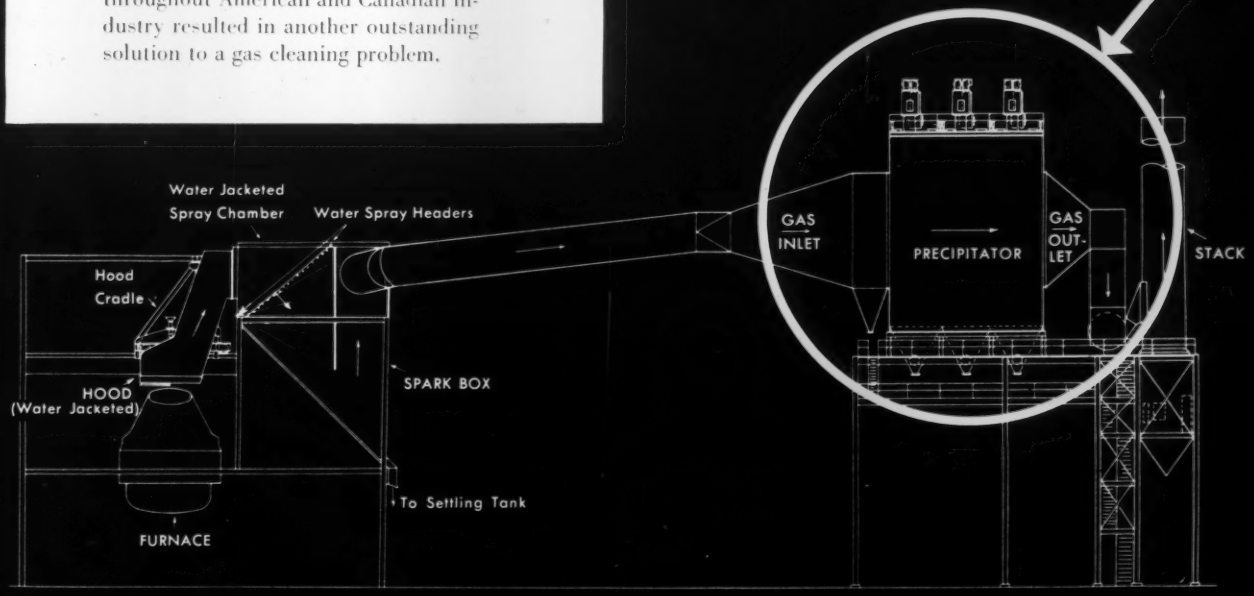
First, the gases generated at the furnace are burned with excess air and cooled in a water-jacketed hood and chamber with water sprays. The water spray header acts as a baffle for the gas, causing the larger particles to fall into the "spark box" and from there to a settling tank.

The gas is further cooled by radiation in the flue connecting the spray chamber to the "gas inlet." The purpose of the "gas inlet" section is to decrease the gas flow, allowing still more of the large particles to drop into the "expansion chamber" before entering the precipitator.

In order to achieve such high collection efficiencies, collecting plates *must be kept clean*. This means that rapping is a highly critical factor in the overall efficiency. Both MI Rappers used for collecting electrodes and the high tension syntron vibrators are operated continuously and automatically. They can be varied in cycle and intensity of rapping time to maintain high efficiencies under changing conditions.

As in all new applications pioneered by Research-Cottrell, the experience of over 2000 precipitator installations throughout American and Canadian industry resulted in another outstanding solution to a gas cleaning problem.





OXYGEN FURNACE GAS CLEANING WITH COTTRELL ELECTRICAL PRECIPITATION

Pay dirt!...year after year!

No need to head West to find "pay dirt": it may well be going up your factory stacks! It's a fact that Buell Dust Collection Systems, in nearly every case, recover dusts that pay for the entire installation in just a few years!

There's an easy, sure way to find out if this is true in your plant: just ask Buell to make an analysis. Buell engineers will tell you, in a short, accurate report, what dusts are going up your stack, what quantities, and what kind of dust collection system you may need to recover them.

A history of hundreds of installations and many years of experience in field and laboratory backs up every analysis. Performance standards are written into each installation contract.

For more information, write for a copy of the booklet, "The Collection and Recovery of Industrial Dusts." Just write to Dept. 26-B, Buell Engineering Company, Inc., 123 William St., New York 38, N. Y.

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MECHANICAL ELECTRICAL

Experts at delivering Extra Efficiency in

DUST COLLECTION SYSTEMS

NEW LITERATURE . . .

and basic analysis methods. Instruments Div., Phillips Electronics Inc., 750 Fulton Ave., Mt. Vernon, N. Y.

Fastener

Advantages, tooling, and technical details of the Hi-Loc fastener are described in a brochure. Hi-Shear Rivet Tool Co., 2600 W. 247th St., Torrance, Calif.

Setscrews

Catalog 13 carries the complete line of No-Mar setscrews which have been designed to eliminate the necessity of split hub gears and clamps. This setscrew permits positive locking and removal of parts without burrs or marks. PIC Design Corp., subsidiary of Benrus Watch Co. Inc., 477 Atlantic Ave., East Rockaway, N. Y.

Oven Suits

Bulletin 1301-1 describes the MSA airfed oven suits. These suits are for workers repairing furnaces, bake ovens, and other intense heat situations. Mine Safety Appliances Co., 201 N. Braddock Ave., Pittsburgh 8, Pa.

Chucking

Form 1117-C is a catalog of chucks, collets, and chucking equipment. It also covers power chuck wrenches, air cylinders, and some special applications. Gisholt Machine Co., 1245 E. Washington, Madison 10, Wis.

Welding

Bulletin 5-12-57 contains basic information on a wide range of welding fixtures and welding tooling. Airline Welding & Mfg. Inc., 785 N. Prairie Ave., Hawthorne, Calif.

Tubing Chart

Engineers, estimators, and buyers will want tech data card TDC-115D. It covers dimensional tolerances (both cold drawn and hot finished) of round, seamless, carbon, and alloy steel mechanical tubing. Tubular Products Div., Babcock & Wilcox Co., Beaver Falls, Pa.

Hydraulic Lift Tables

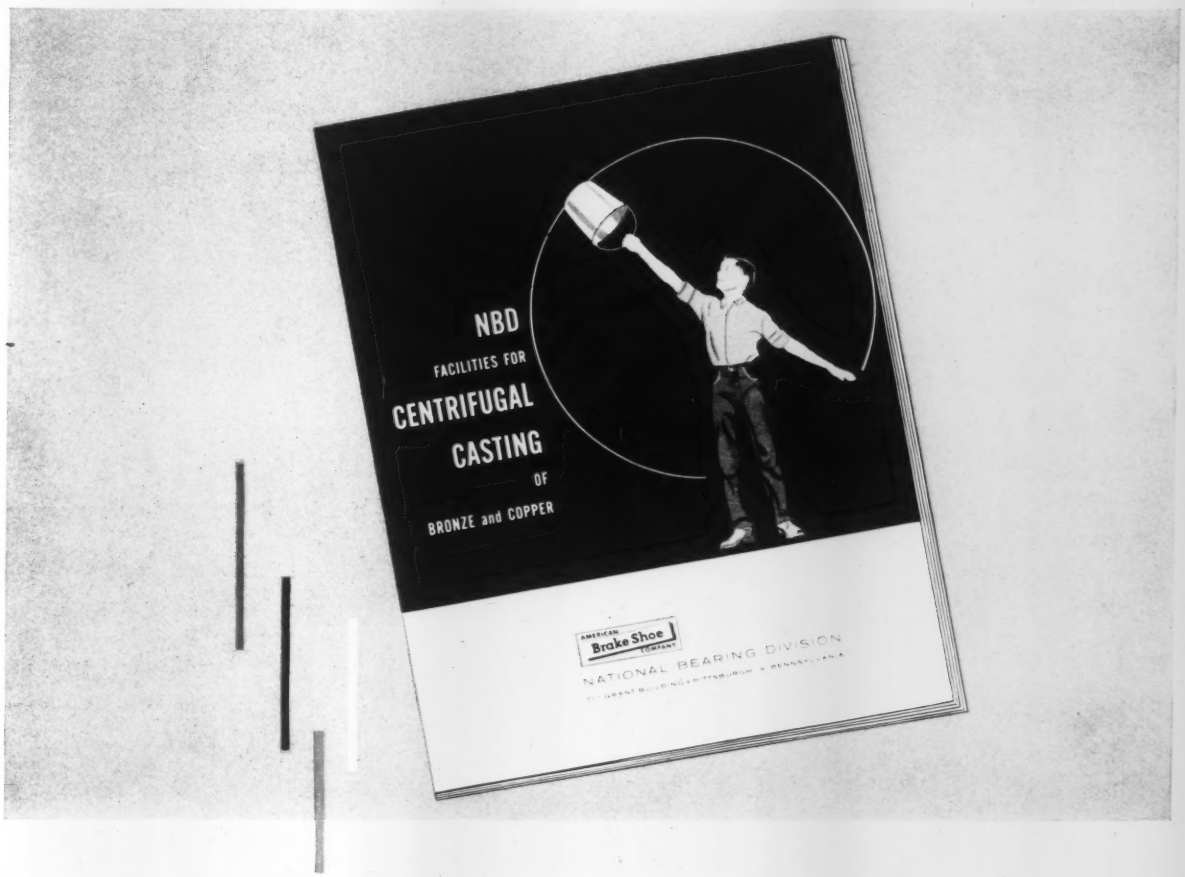
An 8-page booklet tells how problems of lifting, feeding, and work positioning may be simplified. Information and specifications of lift tables and their application in production are also discussed. Southworth Machine Co., 41 Warren Ave., Portland, Maine.

Automatic Cleaner

Bulletin 9000 features an automatic magnetic separator which provides new methods for automatic filtration, the removal of chips and sludge from machine bases, and coolant and cutting oil cleaning. Infilco Inc., P.O. Box 5033, Tucson, Ariz.

Motor Controls

Bulletin GEA-6584, 8 pages, describes a line of co-ordinated starters for low voltage motors up to 600 volts and 1500 hp; describes controls for squirrel-cage,



HOW NBD CENTRIFUGAL CASTING CAN CUT COSTS OF BRONZE PARTS

Engineers know that centrifugal castings have a man-sized strength and soundness hard to match.

This means that in many cases you can design a big part smaller . . . a heavy part lighter . . . and you still get the casting strength you want.

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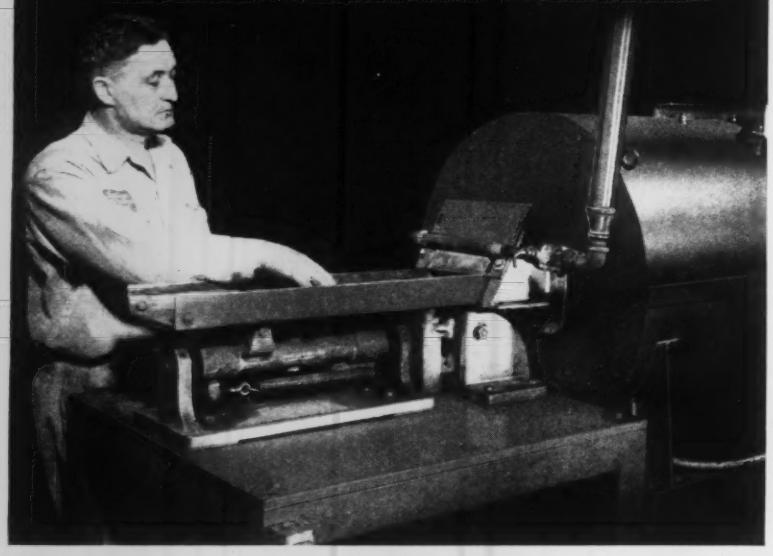
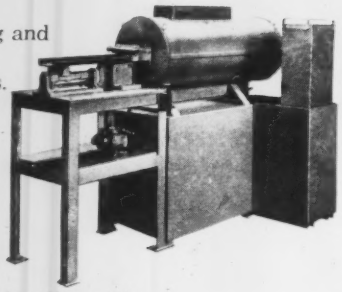


These facts are reported by William T. Courtney of the Courtney Heat Treating Company, in Cuyahoga Falls, Ohio.



This firm has been neutral hardening and carbonitriding springs and rasps of stainless steel, spring steel and alloys. Production has increased from 45 to 50 pounds per hour to 90 to 100 pounds per hour. Maintenance costs have been reduced, there is an exact duplication of quality, and the furnace has the ability to do several heat treating jobs. In addition, they like the ease of operation and handling of parts, the cleanliness of operation and the positive control of temperature.

If you bright harden, carburize, or cyanide small parts, write for Bulletin 850 to see if the Hevi-Duty Shaker Hearth Furnace can save you time and money.

HEVI-DUTY ELECTRIC COMPANY

MILWAUKEE 1, WISCONSIN

Heat Treating Furnaces... Electric Exclusively

Dry Type Transformers *Constant Current Regulators*

NEW LITERATURE . . .

wound-rotor, and synchronous motors; cites features of starters, contactors, overload relays, and accessories and modifications for individual motor controls. General Electric Co., Schenectady 5, N. Y.

Belt Finishing

Selection of offhand belt finishing materials and equipment is simplified by a wall chart. Proper abrasives, grit, belt speed, lubricant, and contact wheel are listed for 16 metals and alloys. Dept. OBF, Behr-Manning Co., division of Norton Co., Troy, N. Y.

Indicating Controllers

Bulletin 510, 16 pages, describes instruments for automatic control of pressure or temperature; transmitters for pressure or temperature indication; and receiver gages of various designs, ranges, and degrees of accuracy and sensitivity. U. S. Gauge Div., American Machine & Metals Inc., Sellersville, Pa.

Grinding Room Calculator

This slide rule tells at a glance how much grinding concentrate to add to a tank for desired results. It covers tanks with capacities ranging from 10 to 150 gallons and is figured in pints, quarts, and gallons. It also translates grinding wheel diameters and revolutions per minute into surface speeds in feet per minute. White & Bagley Co., 100 Foster St., Worcester, Mass.

Motor Frames

Bulletin B-1284-1, gives frame assignments and dimensions of alternating current motors in new NEMA frames and quickly compares Series C and D sizes. Reliance Electric & Engineering Co., 24701 Euclid Ave., Cleveland 17, Ohio.

Fastenings

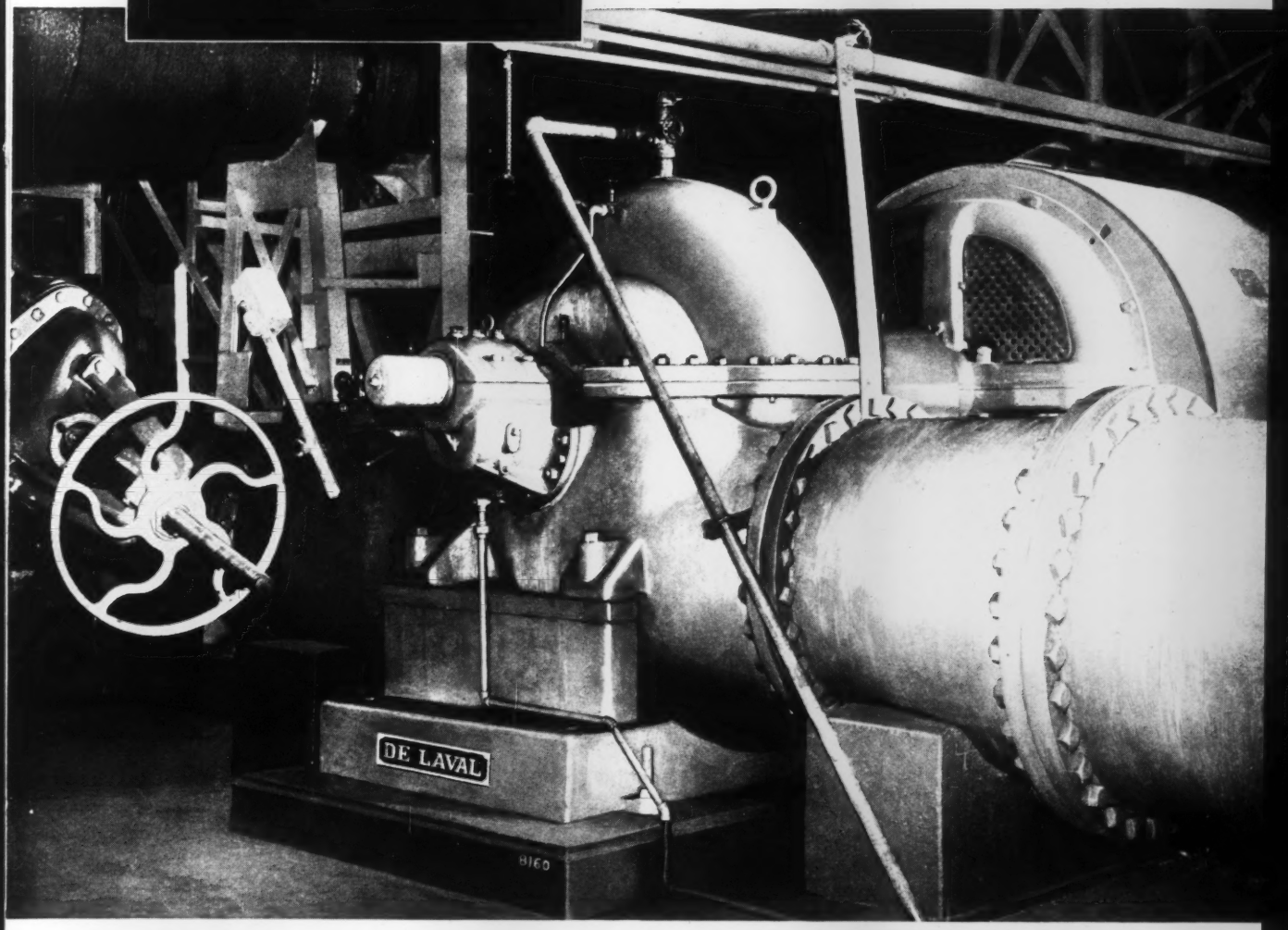
This 84-page catalog contains net prices of corrosion resistant fastenings. H. M. Harper Co., 8299 Lehigh Ave., Morton Grove, Ill.

Industrial Casters

Standard sizes and dimensions for casters and wheels, as well as general duty classifications, are given in the new Industrial Casters Standard. It also con-

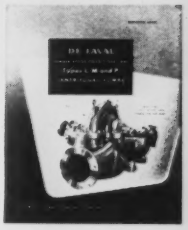
DE LAVAL
CENTRIFUGAL PUMPS

in service since 1911 at Inland Steel Co.



De Laval Centrifugal Pumps have a record of dependability at the Inland Steel Co., which goes back forty-five years. In that time, De Laval has supplied this major producer with pumps for practically every steel mill service—*more than 75 units in all.* The photograph shows one of the largest De Laval pumps on the line at the East Chicago, Indiana plant of Inland Steel. The unit delivers 20,000 gpm at 120 ft head.

De Laval Centrifugal Pumps are available for a wide range of applications in all types of metal-working plants. Types L, M and P single stage double suction pumps can handle capacities from 1,000 to 20,000 gpm and heads to 350 feet. Larger De Laval units of any capacity to meet any requirement for steel mill service are available.

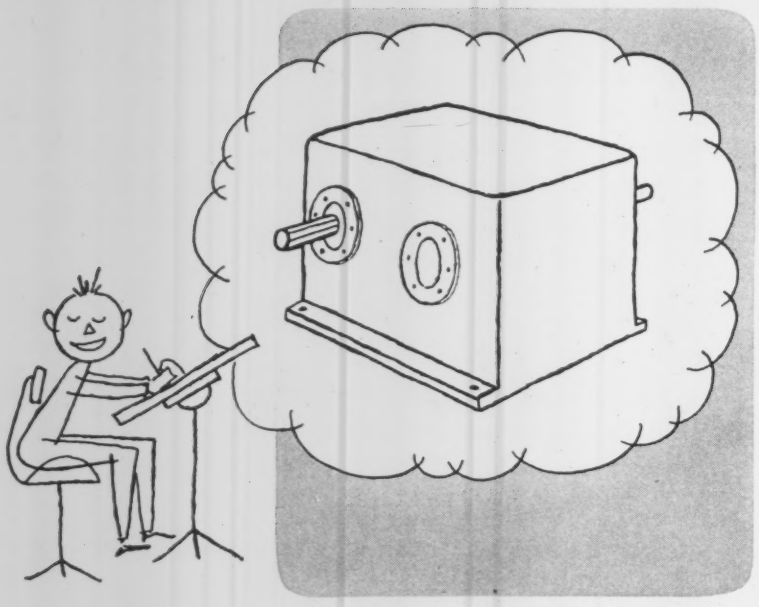


Send for Bulletin 1004 giving performance and application data.

DE LAVAL *Centrifugal Pumps*

DE LAVAL STEAM TURBINE COMPANY
860 *Nottingham Way, Trenton 2, New Jersey*

DL388



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Now you can get top quality CINCINNATI GEARS in *Custom Gear Boxes of your own design.* Speed reducers, speed increasers, planetary units, geared heads. We will manufacture the complete box to your specifications, *and to your satisfaction!*

We *know* gears — how to make and assemble them. Every shaft, bearing and gear in a Cincinnati custom gear box will align and operate properly. Every Cincinnati custom gear box will give you *guaranteed quiet, smooth operation.*

Ask our engineers to talk with you about your closed gearing requirements.

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THE CINCINNATI GEAR CO.

Wooster Pike and Mariemont Ave. Cincinnati 27, Ohio

Custom Gear Makers Since 1907

NEW LITERATURE . . .

tains information on selection, problems, and conditions to be considered when using and purchasing casters. Caster & Floor Truck Manufacturers' Association, 27 E. Monroe St., Chicago 3, Ill.

Boring Machine

This bulletin describes Model 30-012 standard, single end, precision boring machine designed for single or combination operations. Olofsson Corp., 2738 Lyons Ave., Lansing, Mich.

Silicon Chargers

Bulletin AR-100/58 covers the use, design, and construction of the new line of AutoReg chargers for 12-volt electric trucks. C & D Batteries Inc., Conshohocken, Pa.

Finishing Machines

A new catalog portrays Mechamatic finishing machines and the processing media and compounds used with them. Mecha-Finish Corp., South Street W., Sturgis, Mich.

Welded Steel Tubing

A 4-page catalog lists sizes, gages, and finishes of welded steel tubing. Southern Fabricating Co., Sheffield, Ala.

Grinder Attachments

A catalog (G-701) of standard attachments for grinding machines gives the solution to many common problems. Cincinnati Grinders Inc., Cincinnati 9, Ohio.

50-Ton Press

Information, illustrations, and specifications for a 50-ton compacting press are presented in Bulletin 3107. The press handles powdered metals, plastics, ceramics, carbides, cermets, and ferrites. Hamilton Div., Baldwin-Lima-Hamilton Corp., Hamilton, Ohio.

Press Improvement

Bulletin 46 lists 42 kits designed to bring obsolete presses up to date. Modernization and conversion assemblies are described in detail. E. W. Bliss Co., 1375 Raff Rd. S. W., Canton, Ohio.

Hose Fittings

Catalog 4440 describes reusable Hozelok fittings for use with rubber covered, wire braided, hydraulic hose in sizes from 3/16 to 1½ in. inside diameter. *Write:* Parker Fittings & Hose Div., Parker-Hannifin Corp., 17325 Euclid Ave., Cleveland 12, Ohio.

Miniature Couplings

Bulletin MC-100, 4 pages, describes couplings for servomechanisms, computers, and missiles which require nonmagnetic and lightweight parts. Thomas Flexible Coupling Co., Warren, Pa.

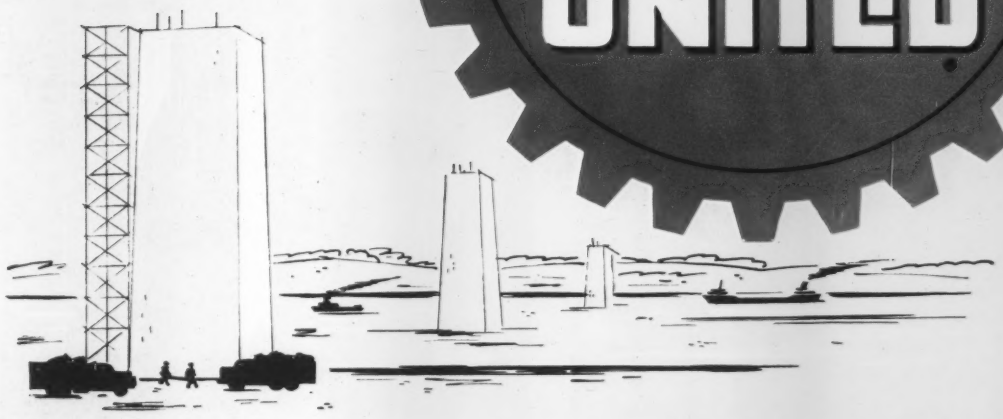
Drilling and Tapping

Accessories for making present machines more versatile and efficient are described in Bulletin AC, 12 pages. Edlund Machinery Co., 44 Huntington St., Cortland, N. Y.

CONTINUOUS BAR MILL

Designed and Built by

UNITED



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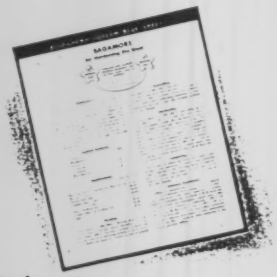
UNITED *can serve you no matter where in the world you are*

Note the complex section of this small ratchet driven friction clutch. Yet, with non-deforming Sagamore Die Steel, there is no distortion or size variation in the intricate webbing.

After being machined from a 3" round bar of Allegheny Ludlum Sagamore, the clutch was hardened from 1775 F. The piece was air cooled and then drawn at 600 F. The result, a Rockwell C hardness of 55 56.

Sagamore is a relatively new type of non-deforming die steel which has had a rapid increase in popularity. It combines excellent non-deforming properties and unusual toughness with freedom from hardening hazards. Similar to high carbon-high chromium steels in behavior and applications, Sagamore has the added advantages of lower hardening temperatures, easier machining and grinding, greater toughness and lower costs.

There's an A-L tool steel to help solve your toughest tool steel problems. For further information, call your nearest office or distributor today, or write . . . *Allegheny Ludlum Steel Corporation, Oliver Building, Pittsburgh 22, Pa.*



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SAGAMORE BLUE SHEET

A concise 4-page booklet of facts on the handling and shop treatments of Sagamore. Included is complete information on forging, annealing, tempering, etc. and detailed laboratory data on physical characteristics. *Ask for your free copy.*

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WSW 6623

AL ® FINE TOOL STEELS SINCE 1854

Market Outlook

DETROIT producers of flat-rolled steel think automotive buying will pick up in April if an auto strike appears unavoidable. They reason that automakers will want enough sheets on hand for high level operations when production is resumed.

WHY NOT NOW?—If automakers think the United Auto Workers will strike in June, why aren't they buying more steel now? These reasons stand out:

- Sales of 1958 models have been disappointing. In January, dealers sold 380,300 cars—22.4 per cent fewer than they did a year ago (490,000).
- On Feb. 1, the new car inventory was 818,000 —21 per cent higher than it was a year ago (645,000).
- At the January sales rate (14,627 a day), dealers have a 56-day inventory. Since they regard 35 days as about right, they're in no mood to accept more cars.
- Although automakers have reduced production (January's output was 489,357, compared with 641,591 a year ago), they'll still turn out about 1.7 million cars between Feb. 1 and May 31, when contracts expire. Subtracting probable sales for the period (1,632,000) from output would mean an addition of 68,000 cars to inventory. With nearly 900,000 cars in dealers' showrooms on June 1, automakers could suspend production for six weeks without inconveniencing buyers. They could even regard a two-week strike as beneficial, since it would cut inventories close to a manageable 700,000.

DETROIT'S AIM—Determined to hold their steel inventories down to 20 days, automakers find the job difficult because of the continuing trend toward lower consumption. Stocks of hot and cold rolled sheets are low. No major order has been placed for a month and a half. Delivery time on spot orders is seven to ten days.

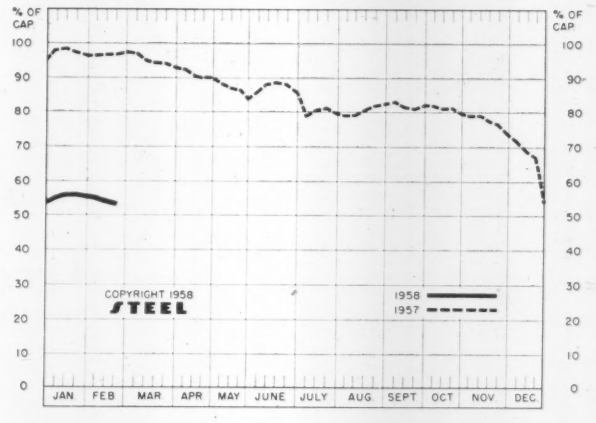
CONSTRUCTION DIPS—Sluggish auto demand isn't the only explanation for the doldrums-stricken steel market. Pittsburgh construction companies report their work has fallen off sharply this month. As a result, they're not in the market for plates or shapes. Mills are absorbing more freight but holding the line on base prices. Fabricated structural prices continue to drop.

BARS MOVE SLOWLY—And users of smaller volumes of steel are cutting back purchases, too. Take manufacturers of screw machine products. In Detroit, for example, they're carrying bar inventories of 20 days or less. With 60-day inventories of parts, they're placing no steel orders until they get calls for finished goods.

BRIGHT TIN PLATE—Tin plate is one of the few bright spots in the present situation. "Sales volume is increasing at a good clip," says Wheeling Steel Corp. "Our customers are already talking about what they'll need in the second quarter. Outlook for the Midwest is especially favorable, with farmers expecting a good year."

PRODUCTION SLIPS—All that adds to the fact that steelmaking operations declined another half point last week to 53.5 per cent of capacity. Production was 1,445,000 tons, compared with 2,501,000 tons for the like week a year ago.

NATIONAL STEELWORKS OPERATIONS



DISTRICT INGOT RATES

(Percentage of Capacity Engaged)

	Week Ended Feb. 16	Change	Same Week 1957	Same Week 1956
Pittsburgh	57.5	— 1*	100	102.5
Chicago	58.5	— 0.5*	97	99
Mid-Atlantic	76	+ 1	98.5	101
Youngstown	54	+ 2	100	100
Wheeling	57	0	100	100.5
Cleveland	38	+ 2*	96	105
Buffalo	46.5	— 5	107.5	105
Birmingham	51.5	— 1	95.5	96.5
New England	50	0	68	73
Cincinnati	45	+ 4*	86	94.5
St. Louis	77	+ 1	91	104.5
Detroit	53.5	+ 0.5*	101.5	103
Western	66	— 2	103	106
National Rate	53.5	— 0.5	97	100

INGOT PRODUCTION‡

	Week Ended Feb. 16	Week Ago	Month Ago	Year Ago
INDEX (1947-49=100)	90.2†	90.7	95.7	155.7
NET TONS (In thousands)	1,449†	1,457	1,538	2,501

*Change from preceding week's revised rate. †Estimated. ‡American Iron & Steel Institute. Weekly capacity (net tons): 2,699,173 in 1958; 2,559,490 in 1957; 2,461,893 in 1956.

Metalworking Outlook—Page 67 Technical Outlook—Page 123

And Still Another Use for SIL-FOS!

Handy & Harman Brazing Alloy Used in Diamond Tool Manufacture

This dramatic application of SIL-FOS clearly points out that, among this alloy's many qualities, its *versatility* is remarkable.

The A. I. T. Diamond Tool Company, Skokie, Illinois, uses SIL-FOS in powder form in the manufacture of its Al-Aloid diamond grinding wheel. The powdered SIL-FOS is mixed with the diamond dust and then sintered to form a wheel that in grinding "... holds sharp edges, does not heat or check carbides, lengthens life of carbide tools and does the work of four to six resin-bonded wheels."

SIL-FOS is one in a large family of Handy & Harman brazing alloys. It is a low-temperature alloy and is available in two analyses: SIL-FOS and SIL-FOS 5. These are silver-copper-phosphorus alloy systems; one contains 15% silver, the other 5%. Both have a wide melting range, starting to flow at 1185°F. and fully free flowing at 1300°F. Their "benefit categories" include: *joint strength, leaktightness, ductility, electrical conductivity, heat transfer, corrosion resistance, fast production and economy.* All of these qualities apply to joining a wide range of nonferrous metals, *as well as diamonds.*

There are many truly remarkable case histories of SIL-FOS brazing. We'd like very much to tell you about them and give you further details on what can be done for your product.

Your NO. 1 Source of Supply and Authority on Brazing Alloys

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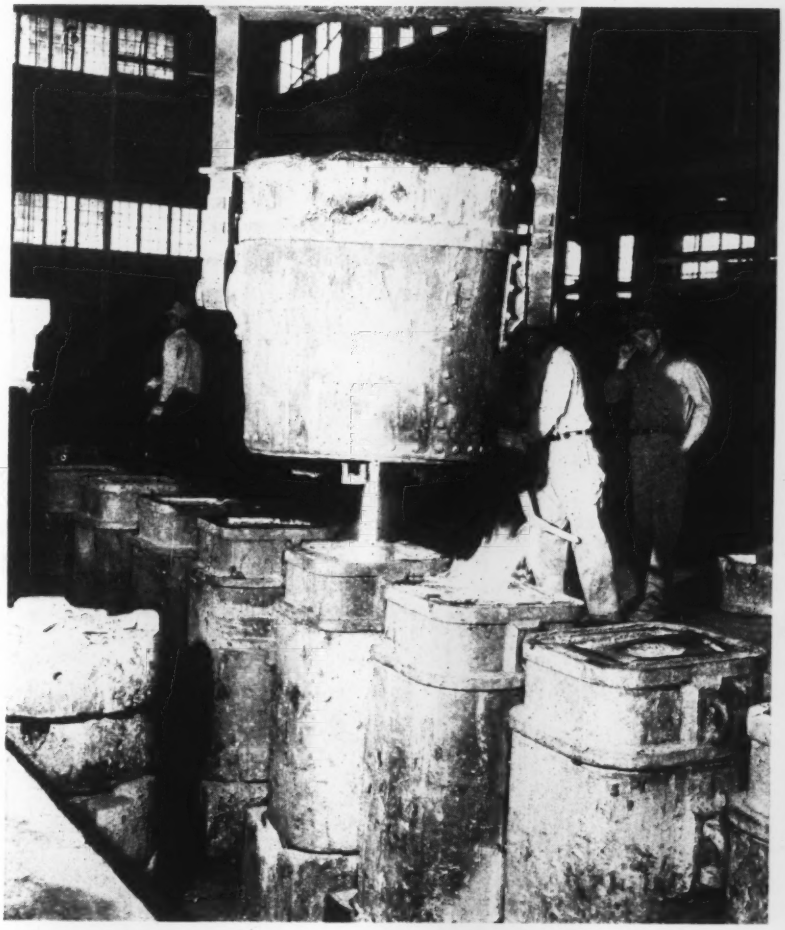
Low-temperature silver alloy brazing with SIL-FOS *and* EASY FLO *is described in our Bulletin 20. Write for your copy.*



Molten metal being transferred to ingot molds at Inco's Huntington, W. Va., works

Nickel-Base Alloys Advance

Producers see best potential in chemical, electronics, and marine applications. Missile uses may take up some of slack left by dwindling aircraft orders

NICKEL-base alloy producers predict a steadily mounting sales volume. Their reasons: 1. Supply of nickel metal is plentiful. 2. Major customer industries are among the fastest growing in the economy.

Definition—Nickel-base alloy is the term given alloy products that have a predominant nickel content.

Examples: International Nickel Co.'s Inconel X contains 73 per cent nickel, 15 per cent chromium, 7 per cent iron, and minute quantities of nine other metals. Hastelloy Alloy B, a product of Union Carbide Corp.'s Haynes Stellite Co., Kokomo, Ind., contains 61 per cent nickel, 28 per cent molybdenum, plus small quantities of iron, cobalt, and chromium.

Use—Says Joseph M. Weldon, assistant to Inco's vice president of sales: "Nickel-base alloys are in demand for their properties of heat and corrosion resistance, strength at high temperatures, and electrical characteristics."

Inco breaks down its 50-odd nickel alloys into three basic types: 1. Monel (two-thirds nickel, one-third copper). 2. Inconel or nickel chromium. 3. Wrought nickel.

Monel has high corrosion resistance and good strength properties. Chief uses are in the marine and chemical industries.

Nickel chromium is the best of the high temperature alloys. Other properties: Resistance to oxidation, strength, corrosion resistance. Biggest use is in aircraft components.

Wrought nickel is chiefly used by the chemical industry, especially for alkaline and chlorine manufacturing and processing. It has high corrosion resistance and noncontaminating properties. An expanding use is in electrical applications.

Growth has been steady in Monel and wrought nickel, more rapid in nickel chromium. Inco reports since 1937 its sales have increased 53 per cent for Monel, 150 per cent for wrought nickel, and a whopping 2500 per cent for nickel chromium. However, tonnage sales of Monel still double deliveries of wrought nickel and run slightly ahead of nickel chromium.

Markets—Biggest consuming industries now are chemical and chemical processing, aircraft, marine, electronics. Haynes Stellite's best customer is the chemical industry which uses the alloys for vats, piping, valves, tubing, and heat exchangers. The company's second largest customer is aircraft—for tail cones, turbine blades, combustion chamber liners, shroud rings.

Allegheny Ludlum Steel Corp., Pittsburgh, says its alloys are used chiefly as electrical steels by the electronic and electrical industries. These alloys eventually wind up in radios, TVs, electronic controls, computers, relays, and in such military applications as bombing and fire control systems, and radar.

General Electric Co.'s Metallurgical Products Dept., Detroit, says its alloys are primarily used in high temperature jet engine components, including afterburner parts, turbine wheels, and buckets. The chemical industry is the major customer of Duriron Co. Inc., Dayton, Ohio.

Inco breaks down its sales like this: Mechanical (includes automotive, aircraft, marine, railroad, etc.),

35 per cent; chemical, 28 per cent; light industry (includes electrical, plumbing and heating, etc.), 13 per cent; miscellaneous (includes conversion, welding products, etc.), 24 per cent.

Makers—Inco turns out about 60 per cent of the domestic alloys. Haynes Stellite is the second major producer; some 12 other companies are important. In addition, scores of companies make alloys in small quantities, especially for electrical use.

Best guess is that nickel-base alloy shipments currently run around 50,000 tons, dollar volume about $150 million.

Deliveries—The turnabout in the nickel supply picture has speeded up deliveries by as much as 300 per cent. Inco reports immediate delivery for standard alloys, although there's still a delay of up to three months for some mill products and up to six months for cold drawn products. "Just a year ago we were quoting delivery time on some of these products at 18 months," Mr. Weldon says.

Haynes Stellite is promising deliveries within four to eight weeks for most mill products; Allegheny Ludlum within eight weeks.

Cost—Price of basic alloys has remained fairly stable over the past few years. But the trend in mill products has been up. For example: An alloy that sold for $2 a pound in plate form in 1950 now costs $2.57.

Producers don't look for any general increase in 1958.

Prospects — Says Mr. Weldon: "We are confident of a sound growth pattern. Reasons: 1. Extension of existing uses (for example, the chemical industry plans a $45 billion expansion). 2. Return of customers to original specifications calling for nickel. 3. The trend towards products that will be efficient at higher temperatures."

Clouding the outlook is the switch in defense spending away from manned aircraft toward missiles. Most makers see a good potential for alloys in missiles (especially in electronic systems) but orders have not yet started filtering down from primary contractors. It's still too early to adequately evaluate this market, they say. Other promising areas: Electronics, atomic energy, gas turbine engines.

Steel Bars . . .

Bar Prices, Page 187

Of all the major tonnage steel products, bars are in slowest demand. Despite a diversity of inquiry, the lag in specification continues pronounced, and tonnage in all sizes and shapes is readily available. Consumers can get deliveries of hot-rolled carbon bars within a week by shopping. Often they don't even have to do that.

Much the same situation prevails in cold finished bars. Most converters hold substantial stocks of the popular sizes and can give prompt shipments. Cold-drawn bar mill operations are down to four days a week in some instances, and there isn't any sign of early improvement though suppliers are banking on a March pickup in orders.

Although supplies are in excess of demand and competition for the meager orders current is sharp, mill prices are holding firmly, including

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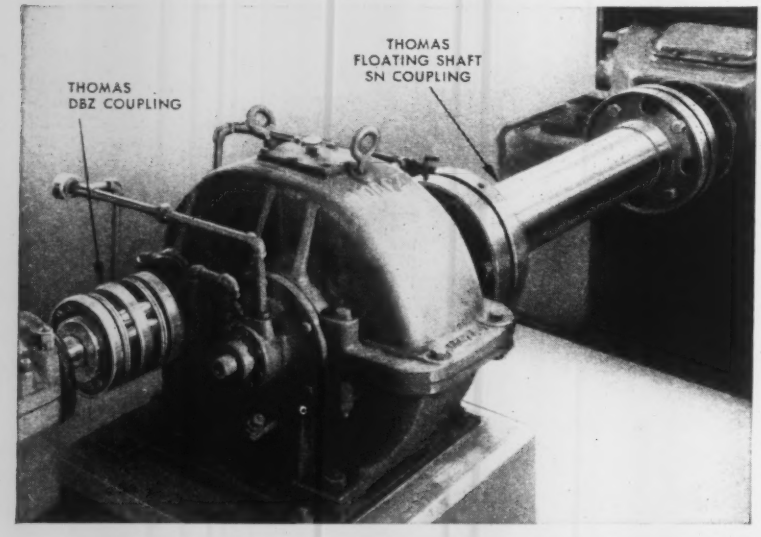

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established extras. Even though consumers complain that prices are "too high," there is a surprising lack of pressure for concessions. That is contrary to prewar experience under similar conditions when buyers usually hammered prices down. They frequently dangled attractive tonnages (principally automotive) before suppliers with a view to bringing out lower quotations.

Some Steel Records Set

Total shipments for 1957 off but new peaks are scored by some products and markets

Mill shipments of finished steel products totaled 79,894,577 net tons in 1957. This was the fourth highest annual total, reports the American Iron & Steel Institute. Records were established for numerous separate items and market classifications during the year.

In 1956, the total movement was 83,251,168 net tons. The record year was 1955 with 84.7 million.

December, 1957, shipments amounted to 5,092,913 tons, compared with 5,606,018 in November, and 7,064,093 in December, 1956.

Products shipped in the greatest tonnages last year, compared with shipments of like products in 1956 were:

Products	Net Tons 1957	Rank	Net Tons 1956	Rank
Cold-rolled sheets	11,879,354	1	13,317,002	1
Plates	9,248,625	2	7,714,623	4
Hot-rolled sheets	7,829,992	3	8,790,540	3
Hot-rolled bars	7,567,400	4	8,840,349	2
Structural shapes	6,817,796	5	5,348,981	5
Electrolytic tin plate	4,676,482	6	4,615,068	6

Records were set during 1957 in shipments of heavy structural shapes and electrolytic tin plate. Other records: Line pipe, 4,218,513 net tons; oil country tubular goods, 2,822,854; steel piling, 569,673.

Principal market groups last year, compared with 1956, were:

Markets	Net Tons 1957	% Domestic Shipments	Net Tons 1956	% Domestic Shipments
Warehouses	14,507,308	19.3	16,752,233	21.0
Automotive	14,227,096	18.9	14,141,887	17.8
Construction	12,523,285	16.6	10,441,126	13.1
Containers	6,237,583	8.3	6,818,361	8.6
Machinery, etc.	4,512,298	6.0	5,031,599	6.3
Rail transport	4,149,074	5.5	4,226,654	5.3

Record shipments to the construction category (including maintenance) were reported. In that market grouping, the two largest categories were oil and gas industry construction (3,469,507 net tons —a record), and all other construction (8,982,681 tons—also a record). Still another was set in shipments to warehouses and distributors of oil and gas industry goods at 2,232,742 net tons.

By adding all shipments for the oil and gas industry, a new record of 6,493,750 net tons was established for that category last year. This topped by 912,000 tons the former record of 5,581,934 set in 1956.

Stainless Steel . . .

Stainless Steel Prices, Page 191

Prices have been marked down about 1 per cent on Types 304 and 316 stainless sheets and cold-rolled strip (see STEEL, Feb. 10, p. 115). Allegheny Ludlum Steel Corp., Pittsburgh, U. S. Steel Corp., Pitts-

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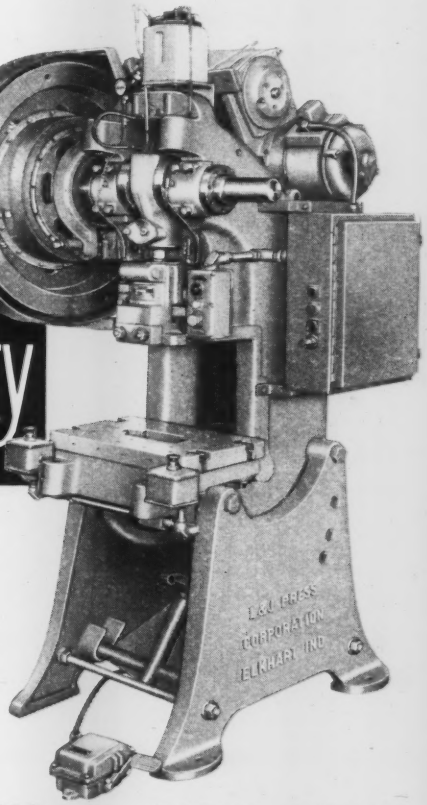

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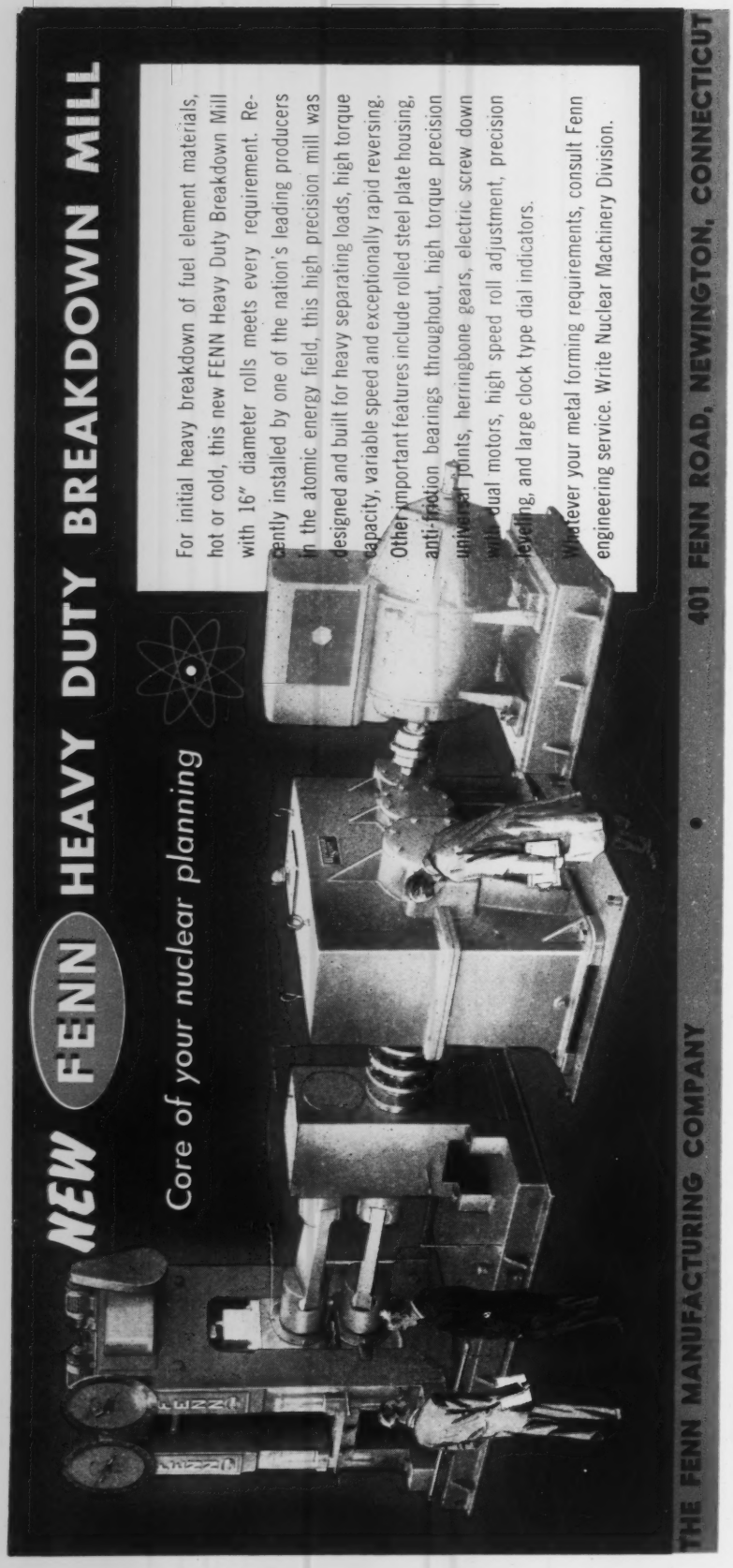
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burgh, Republic Steel Corp., Cleveland, and Carpenter Steel Co., Reading, Pa., posted the new prices at the start of this month.

Under the new schedule, Type 304 sheets and strip are quoted at 55 cents a pound, against 55.50 cents formerly; Type 316 sheets and strip are quoted at 80.75 cents, against 81.50 cents before.

The reduced postings make these companies' prices competitive with those quoted by McLouth Steel Corp., Detroit.

Tool Steel . . .

Tool Steel Prices, Page 191

Shipments of high speed and tool steel (excluding hollow drill steel) amounted to 98,712 net tons in 1957, reports the American Iron & Steel Institute. This was down sharply from the 125,866 tons shipped in 1956.

December tonnage totaled 6710, compared with 7056 tons shipped in the preceding month, and 8672 tons moved in December, 1956. Comparative figures follow:

HIGH SPEED & TOOL STEEL SHIPMENTS
(Net Tons)

Months	1957	1956	1955	1954
January	9,457	11,113	7,822	8,117
February	9,182	10,613	7,902	7,431
March	10,132	11,370	9,869	8,454
April	9,079	11,720	9,786	7,297
May	10,244	12,730	10,067	6,300
June	7,989	13,149	11,854	7,314
July	6,034		7,504	5,277
August	7,479	*10,354	*8,994	6,475
September	7,915	9,426	9,418	6,269
October	7,435	10,790	10,095	6,587
November	7,056	9,889	10,615	7,158
December	6,710	8,672	10,777	7,464
Totals	98,712	125,866	114,529	84,143

*July and August tonnages combined.
Data from American Iron & Steel Institute

Tubular Goods . . .

Tubular Goods Prices, Page 191

Although oil country tubular goods requirements are expected to increase in March, current demands still tend downward.

Tube mill operations have been curtailed over recent weeks.

The backlog of unfilled orders for pressure tubing is down, but the long range outlook for this item is favorable. Utilities are expected to boost purchases this year.

Mechanical tubing orders are sluggish, but a prospective pickup in road building equipment needs provides a promising note.

Distributors of buttweld pipe are well stocked and haven't started buying for spring requirements. Quick mill shipments are available.

Imports of pipe on the West Coast, ½ in. and 4 in. in diameter, have increased lately, cutting into sales by domestic mills. Most of the imported pipe is coming from Australia and Europe.

Republic Steel Corp.'s Youngstown plant will install new equipment at its No. 3 electricweld tube mill at a cost of $300,000. An electrically operated mechanical skelp cleaner and two 16-in. pipe cutoff machines will be included.

Sheets, Strip . . .

Sheet & Strip Prices, Pages 188 & 189

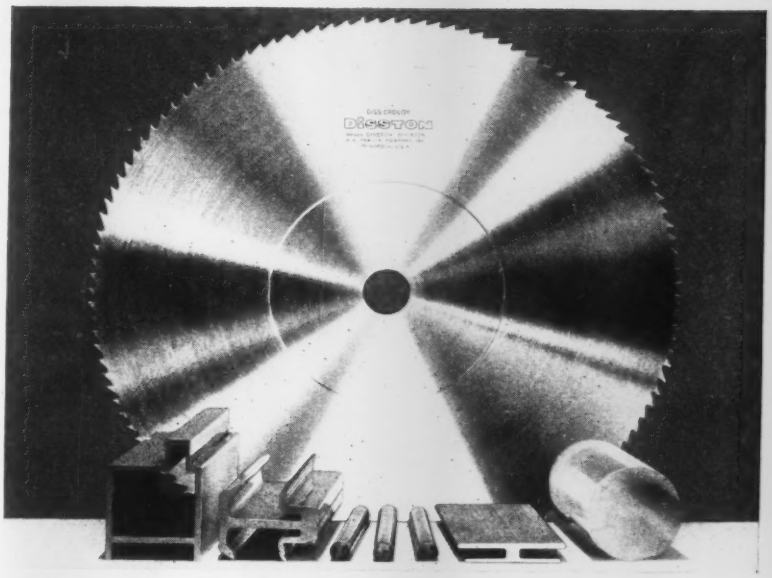
Sheet demand is in a slight upturn at some centers. Eastern suppliers report more tonnage is going into stoves, welded tubing, and air-conditioning. Specifications for shelving and office furniture are holding up, while fabricators of light tanks are showing a little more interest in needs.

Pipe and gutter interests at Philadelphia are laying in a little more tonnage in anticipation of spring building activity. Air-conditioning contractors are specifying more freely at that point. In the St. Louis area, order prospects are brighter. December-January bookings there were above the May-to-November average. Shipments were above November's. District mill operations will improve this month in anticipation of a scheduled five-week shutdown of the cold mill in that area beginning next month.

Auto industry buying is disappointing. There is no indication of any substantial improvement in this market area soon. Sheetmakers are beginning to get skeptical over the possibilities for strong auto demand this spring, though automotive shops on the West Coast are reported back in the market for substantial tonnage.

The appliance industry is not showing any signs of expanding activity. Inventories of finished appliances are high.

While some sheet orders are appearing for March shipment, generally there is little forward buying. Tonnage is being placed chiefly on the basis of earliest delivery. Having built up substantial stocks of semi-finished steel, many mills can get out tonnage well under normal leadtime. Hot-rolled sheets are available within two weeks, cold-



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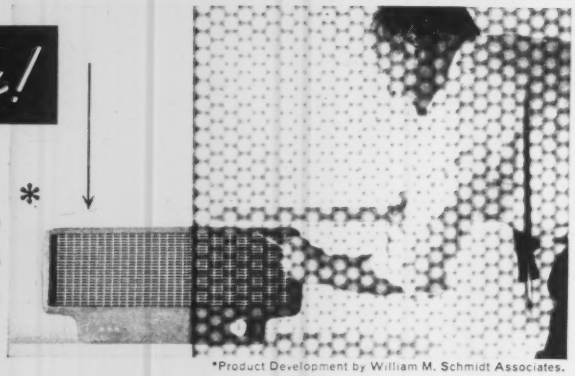

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Tin Plate . . .

Tin Plate Prices, Page 189

Tin mill product shipments are rising steadily, reports a Pittsburgh producer, and the outlook for March is for further gains of 10 per cent or more. Shipments in the second quarter should compare favorably with the showing during that period in recent years.

Plates . . .

Plate Prices, Page 187

One of the biggest surprises in the steel market is the rapid slowdown in plate demand since last fall. It is attributed mainly to holdups in production of welded line pipe resulting from an unfavorable court ruling on natural gas rates last November.

The Supreme Court will review the ruling soon, but it is thought unlikely there will be much activity in fabricated pipe until the issue is resolved.

Though plate inquiry is off from a couple of months back, there is as slight stir in the market which might lead to better production in March. Building construction and tankwork hold promise of improved activity this spring, and there is some quickening of interest in miscellaneous consuming lines. Orders, though, continue sluggish and deliveries (especially light plates) are easy.

Fabricators of elevated water tanks report spotty demand. Business is highly competitive. Industrial requirements are slow. Some pickup in municipal needs is expected as more preliminary figures are being requested than in some time. Oil storage tank demand is short of expectations. Specifications for light domestic fuel oil tanks are slow.

Although ship contracts have declined (tanker work in particular), the shipyards lead in plate consumption. Most Atlantic yards have good backlogs. Heavier naval shipyard inquiry is out for the second quarter, calling for hull plates and high tensile material.

As part of the merchant ship replacement program, the Maritime Board has placed contracts for eight 10,000-ton deadweight cargo vessels, two each to: East coast yards, Sun

Shipbuilding & Drydock Co., Chester, Pa., and New York Shipbuilding Co., Camden, N. J.; west coast yards, National Steel & Shipbuilding Corp., San Diego, Calif., and Todd Shipyards Corp., San Pedro, Calif. The contracts are the first to be placed under a 1956 shipbuilding allocation law.

Warehouse . . .

Warehouse Prices, Page 192

The consensus among distributors is that February sales will be lower than January's and will mark the year's low point. A wave of layoffs at large manufacturing plants across the nation has reduced demand for warehouse steel.

Most warehouse sales managers expect an improvement—possibly in March, certainly in April. If bookings increase substantially next month, it will be due chiefly to the usual seasonal gain in building and highway construction. Other important factors include the greater number of working days in the month (compared with February) and the depletion of steel inventories in numerous manufacturing lines.

Wire . . .

Wire Prices, Pages 189 & 190

Seasonal factors are expected to push up demand for wire and wire products noticeably over the next few weeks. Current buying, though, is sluggish and wire mill operations range from less than 50 to more than 70 per cent.

Eastern mills are operating below 50 per cent (ingot production and finishing operations). In the Midwest, producers appear to be doing better. In the St. Louis area, for example, operations average 60 to 70 per cent.

Wire rod inventories are substantial and drawn wire schedules in the East just about equal primary steel production.

Reinforcing Bars . . .

Reinforcing Bar Prices, Page 187

While reinforcing steel bar supply continues well in excess of demand, closer balance is expected shortly as the weather moderates and seasonal requirements burgeon.

Presently, a mild increase in buying for higher educational building

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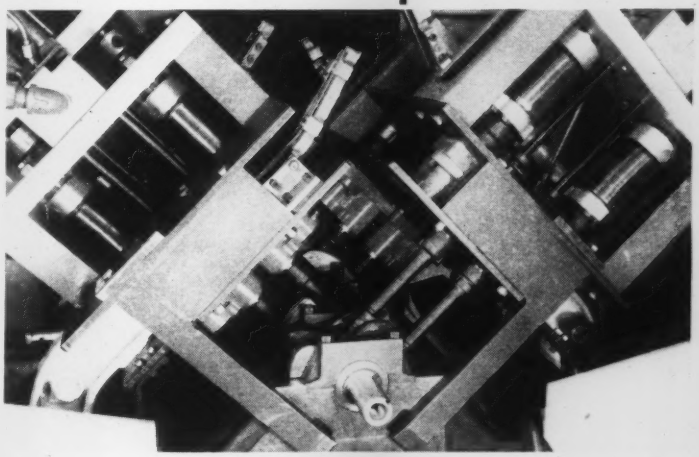

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Steel Ingot Production—January, 1958

Period	—OPEN HEARTH— Net tons	Per cent of capacity	——BESSEMER—— Net tons	Per cent of capacity	——ELECTRIC—— Net tons	Per cent of capacity	———TOTAL——— Net tons	Per cent of capacity
1958								
†January	6,077,000	58.5	121,000	35.4	541,000	44.3	6,739,000	56.4
1957								
January	9,829,691	99.0	294,839	77.1	884,232	86.5	11,008,762	97.1
February	8,898,671	99.2	277,682	80.4	810,853	87.8	9,987,206	97.6
March	9,442,164	95.1	275,156	71.9	871,754	85.2	10,589,074	93.4
1st Qtr.	28,170,526	97.7	847,677	76.3	2,566,839	86.4	31,585,042	96.0
April	8,820,328	91.8	231,731	62.6	762,721	77.1	9,814,780	89.5
May	8,842,707	89.1	201,864	52.8	747,752	73.1	9,792,323	86.4
June	8,498,903	88.4	210,915	57.0	681,584	68.9	9,391,402	85.6
2nd Qtr.	26,161,938	89.8	644,510	57.4	2,192,057	73.0	28,998,505	87.2
1st 6 Mo.	54,332,464	93.7	1,492,187	66.8	4,758,896	79.7	60,583,547	91.5
July	8,086,519	81.4	194,638	50.9	627,575	61.4	8,908,732	78.6
August	8,297,172	83.6	204,723	53.5	731,995	71.6	9,233,890	81.5
September	8,135,139	84.7	185,967	50.2	656,800	66.4	8,977,906	81.8
3rd Qtr.	24,518,830	83.2	585,328	51.5	2,016,370	66.4	27,120,528	80.6
9 Mo.	78,851,294	90.2	2,077,515	61.7	6,775,266	75.2	87,704,075	87.9
October	8,348,522	84.1	154,577	40.4	694,618	67.9	9,197,717	81.1
November	7,674,698	79.9	134,709	36.4	583,512	59.0	8,392,919	76.5
*December	6,783,262	68.3	108,237	28.3	528,686	51.7	7,420,285	65.5
*4th Qtr.	22,806,482	77.4	397,623	35.0	1,806,816	59.5	25,010,921	74.4
*2nd 6 Mo.	47,325,312	80.3	982,951	43.3	3,823,186	63.0	52,131,449	77.5
*Total	101,657,776	87.0	2,475,138	54.9	8,582,082	71.3	112,714,996	84.5

Note—The percentages of capacity operated are based on annual capacities as of Jan. 1, 1958 as follows: Open hearth 122,321,830 net tons; bessemer 4,027,000 net tons; oxygen process, electric and crucible 14,398,740 net tons. Total for 1958, 140,742,570 net tons. For 1957, the capacity tonnages are: Open hearth 116,912,410 net tons; bessemer 4,505,000 net tons; oxygen process, electric and crucible 12,041,740 net tons. Total for 1957, 133,459,150 net tons.

*Revised

†Preliminary

Steel Shipments by Market Classifications

(All Grades; Net Tons)

Markets:	——December 1957—— Tonnage	% of Total	——Total Tonnage for Year—— 1957 Tons	% of Total	1956 Tons	% of Total
Converting	238,558	5.0	3,396,529	4.5	3,776,559	4.7
Forgings (other than auto)	62,970	1.3	1,056,036	1.4	1,473,186	1.8
Bolts, etc.	83,073	1.7	1,149,545	1.5	1,485,087	1.9
Warehouses:						
Oil & gas	104,568	2.2	2,323,742	3.1	2,247,184	2.8
All other	647,883	13.6	12,183,566	16.2	14,505,049	18.2
Total warehouse	752,451	15.8	14,507,308	19.3	16,752,233	21.0
Construction:						
Railroad	5,414	0.1	71,097	0.1	65,959	0.1
Oil & gas	229,290	4.8	3,469,507	4.6	2,556,036	3.2
All other	644,048	13.5	8,982,681	11.9	7,819,131	9.8
Total construction	878,752	18.4	12,523,285	16.6	10,441,126	13.1
Contractors' products	210,929	4.4	3,403,580	4.5	4,074,577	5.1
Automotive:						
Cars, etc.	1,069,265	22.4	13,895,315	18.5	13,744,303	17.3
Forgings	20,750	0.4	331,781	0.4	397,584	0.5
Total auto.	1,090,015	22.8	14,227,096	18.9	14,141,887	17.8
Railroad:						
Rails, etc.	49,574	1.0	1,406,157	1.9	1,590,013	2.0
Cars, etc.	151,743	3.2	2,703,006	3.6	2,604,447	3.3
Street railways	3,635	0.1	39,911		32,194	
Total railroad	204,952	4.3	4,149,074	5.5	4,226,654	5.3
Shipbuilding	103,261	2.2	1,277,772	1.7	760,306	1.0
Aircraft	4,218	0.1	99,561	0.1	134,721	0.2
Oil & gas drilling	35,656	0.7	700,501	0.9	778,714	1.0
Mining, etc.	19,056	0.4	328,803	0.4	349,508	0.4
Agricultural:						
Machinery	83,798	1.8	915,151	1.2	818,731	1.0
All other	9,812	0.2	182,951	0.3	263,728	0.3
Total agriculture	93,610	2.0	1,098,102	1.5	1,082,459	1.3
Machinery, tools	267,168	5.6	4,512,298	6.0	5,031,599	6.3
Elec. machinery	130,082	2.7	2,085,675	2.8	2,437,804	3.1
Appliances, etc.	116,796	2.4	1,558,569	2.1	2,129,115	2.7
Other equipment	114,265	2.4	1,837,940	2.4	2,263,775	2.8
Containers:						
Cans, etc.	215,529	4.5	4,830,538	6.4	5,025,825	6.3
Barrels, etc.	45,152	0.9	817,533	1.1	1,018,873	1.3
All other	35,608	0.8	589,512	0.8	773,663	1.0
Total containers	296,289	6.2	6,237,583	8.3	6,818,361	8.6
Ordnance, etc.	22,417	0.5	356,406	0.5	523,890	0.7
Non-reported tonnage	50,033	1.1	820,119	1.1	947,180	1.2
Total domestic shipments	4,774,551	100.0	75,325,782	100.0	79,628,741	100.0
Exports	318,362		4,568,795		3,622,427	
Total shipments	5,092,913		79,894,577		83,251,168	

Totals do not include shipments to reporting companies for conversion or resale.

Data from American Iron & Steel Institute.

construction is bolstered by heavier estimating for bridges in New England. New buildings for Harvard University will require 1150 tons; Boston University, 475 tons.

More highway and bridge jobs are being let but price competition is increasing. Frequently, contractors are able to hammer prices down as much as $10 a ton and more from original estimates. Many distributors drop out of competition when price shading starts.

An increasing tonnage of reinforcing bars is coming into this country from Japan.

January Steel Output Off

Production of ingots and steel for castings totaled 6,739,000 net tons in January, reports the American Iron & Steel Institute. The figure is down noticeably from the 7,420,285 tons produced in December, 1957, and is off sharply from the 11,008,762 tons poured in January a year ago.

The institute's index of steelmaking for January stood at 94.7, using 1947-49 as the base period. Comparisons: 104.3 in December, and 154.7 in January, 1957.

Based on the 1958 capacity rating of 140,742,570 net tons, operations in January averaged 56.4 per cent. December operations (based on rated capacity of 133,459,150 net tons) averaged 65.4 per cent; the January, 1957, rate was 97.1 per cent.

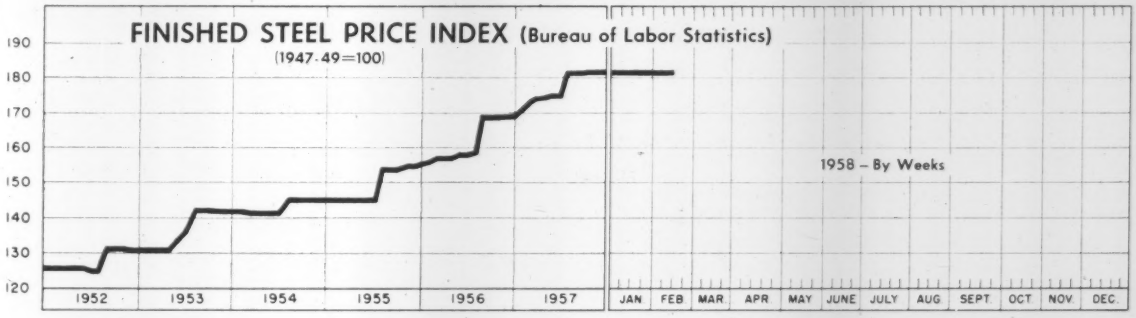
Semifinished Steel . . .

Semifinished Prices, Page 187

Steelmaking operations continue to slide; last week the national ingot rate slipped another half point to 53.5 per cent of current capacity (2,699,173 net tons weekly). Signs of a recovery, though, are noted here and there. For instance, Kaiser Steel Corp. has fired up a seventh open hearth furnace and called back 75 to 100 workmen at its Fontana, Calif., plant.

The Youngstown plant of Jones & Laughlin Steel Corp.'s Strip Steel Div. was closed down last week, idling about 310 men. About 300 employees of the Sand Springs (Okla.) plant of the Sheffield Steel Div., Armco Steel Corp., are on a 32-hour week. The company is seeking to spread the work as far as possible.

Price Indexes and Composites



Feb. 11, 1958	Week Ago	Month Ago	Jan. Avg.	Year Ago
181.7	181.7	181.7	181.7	171.9

AVERAGE PRICES OF STEEL (Bureau of Labor Statistics)

Week Ended Feb. 11

Prices include mill base prices and typical extras and deductions. Units are 100 lb except where otherwise noted in parentheses. For complete description of the following products and extras and deductions applicable to them, write to STEEL.

Rails, Standard No. 1	$5.600	Bars, Reinforcing	6.210
Rails, Light, 40 lb	7.067	Bars, C.F., Carbon	10.360
Tie Plates	6.600	Bars, C.F., Alloy	13.875
Axles, Railway	9.825	Bars, C.F., Stainless, 302 (lb)	0.553
Wheels, Freight Car, 33 in. (per wheel)	60.000	Sheets, H.R., Carbon	6.192
Plates, Carbon	6.150	Sheets, C.R., Carbon	7.089
Structural Shapes	5.942	Sheets, Galvanized	8.230
Bars, Tool Steel, Carbon (lb)	0.535	Sheets, C.R., Stainless, 302 (lb)	0.688
Bars, Tool Steel, Alloy, Oil Hardening Die (lb)	0.650	Sheets, Electrical	12.025
Bars, Tool Steel, H.R., Alloy, High Speed, W 6.75, Cr 4.5, V 2.1, Mo 5.5, C 0.60 (lb)	1.355	Strip, C.R., Carbon	9.243
Bars, Tool Steel, H.R., Alloy, High Speed, W18, Cr 4, V 1 (lb)	1.850	Strip, C.R., Stainless, 430 (lb)	0.493
Bars, H.R., Alloy	10.525	Strip, H.R., Carbon	6.245
Bars, H.R., Stainless, 303 (lb)	0.525	Pipe, Black, Buttweld (100 ft)	19.814
Bars, H.R., Carbon	6.425	Pipe, Galv., Buttweld (100 ft)	23.264
		Pipe, Line (100 ft)	199.023
		Casing, Oil Well, Carbon (100 ft)	194.499
		Casing, Oil Well, Alloy (100 ft)	304.610
		Tubes, Boiler (100 ft)	49.130
		Tubing, Mechanical, Carbon (100 ft)	24.953
		Tubing, Mechanical, Stainless, 304 (100 ft)	205.608
		Tin Plate, Hot-dipped, 1.25 lb (95 lb base box)	9.783
		Tin Plate, Electrolytic, 0.25 lb (95 lb base box)	8.483
		Black Plate, Canmaking Quality (95 lb base box)	7.583
		Wire, Drawn, Carbon	10.225
		Wire, Drawn, Stainless, 430 (lb)	0.653
		Bale Ties (bundles)	7.967
		Nails, Wire, 8d Common	9.828
		Wire, Barbed (80-rod spool)	8.719
		Woven Wire Fence (20-rod roll)	21.737

STEEL's FINISHED STEEL PRICE INDEX*

	Feb. 12 1958	Week Ago	Month Ago	Year Ago	5 Yr Ago
Index (1935-39 avg=100)	239.15	239.15	239.15	225.92	181.31
Index in cents per lb	6.479	6.479	6.479	6.111	4.912

STEEL's ARITHMETICAL PRICE COMPOSITES*

Finished Steel, NT	$145.42	$145.42	$145.42	$137.98	$110.98
No. 2 Fdry Pig Iron, GT	66.49	66.49	66.49	62.63	55.04
Basic Pig Iron, GT	65.99	65.99	65.99	62.18	54.66
Malleable Pig Iron, GT	67.27	67.27	67.27	63.41	55.77
Steelmaking Scrap, GT	37.67	37.33	33.33	53.17	43.00

*For explanation of weighted index see STEEL, Sept. 19, 1949, p. 54; of arithmetical price composite, STEEL, Sept. 1, 1952, p. 130.

Comparison of Prices

Comparative prices by districts, in cents per pound except as otherwise noted. Delivered prices based on nearest production point.

FINISHED STEEL	Feb. 12 1958	Week Ago	Month Ago	Year Ago	5 Yr Ago
Bars, H.R., Pittsburgh	5.425	5.425	5.425	5.075	3.95
Bars, H.R., Chicago	5.425	5.425	5.425	5.075	3.95
Bars, H.R., deld., Philadelphia	5.725	5.725	5.725	5.365	4.502
Bars, C.F., Pittsburgh	7.30*	7.30*	7.30*	6.85*	4.925
Shapes, Std., Pittsburgh	5.275	5.275	5.275	5.00	3.85
Shapes, Std., Chicago	5.275	5.275	5.275	5.00	3.85
Shapes, deld., Philadelphia	5.545	5.545	5.545	5.31	4.13
Plates, Pittsburgh	5.10	5.10	5.10	4.85	3.90
Plates, Chicago	5.10	5.10	5.10	4.85	3.90
Plates, Coatesville, Pa.	5.10	5.10	5.10	5.25	4.35
Plates, Sparrows Point, Md.	5.10	5.10	5.10	4.85	3.90
Plates, Claymont, Del.	5.10	5.10	5.10	5.70	4.35
Sheets, H.R., Pittsburgh	4.925	4.925	4.925	4.675	3.775
Sheets, H.R., Chicago	4.925	4.925	4.925	4.675	3.775
Sheets, C.R., Pittsburgh	6.05	6.05	6.05	5.75	4.575
Sheets, C.R., Chicago	6.05	6.05	6.05	5.75	4.575
Sheets, C.R., Detroit	6.05-6.15	6.05-6.15	6.05-6.15	5.75-5.85	4.775
Sheets, Galv., Pittsburgh	6.60	6.60	6.60	6.30	5.075
Strip, H.R., Pittsburgh	4.925	4.925	4.925	4.675	3.975-4.225
Strip, H.R., Chicago	4.925	4.925	4.925	4.675	3.725
Strip, C.R., Pittsburgh	7.15	7.15	7.15	6.85	5.10-5.80
Strip, C.R., Chicago	7.15	7.15	7.15	6.85	5.35
Strip, C.R., Detroit	7.25	7.25	7.25	6.95	5.30-6.05
Wire, Basic, Pittsburgh	7.65	7.65	7.65	7.20	5.475-5.225
Nails, Wire, Pittsburgh	8.95	8.95	8.95	8.20	6.35
Tin plate (1.50 lb) box, Pitts.	$10.30	$10.30	$10.30	$9.95	$8.95

*Including 0.35c for special quality.

SEMIFINISHED STEEL					
Billets, forging, Pitts. (NT)	$96.00	$96.00	$96.00	$91.50	$70.50
Wire rods, $\frac{7}{32}$-$\frac{9}{16}$" Pitts.	6.15	6.15	6.15	5.80	4.425

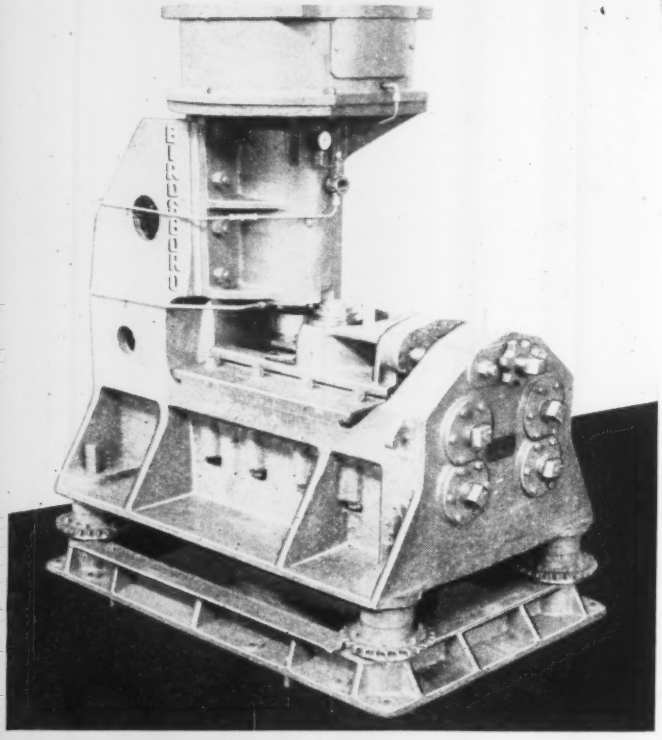
PIG IRON, Gross Ton	Feb. 12 1958	Week Ago	Month Ago	Year Ago	5 Yr Ago
Bessemer, Pitts.	$67.00	$67.00	$67.00	$63.50	$55.50
Basic, Valley	66.00	66.00	66.00	62.50	54.50
Basic, deld., Phila.	70.41	70.01	70.01	66.26	59.25
No. 2 Fdry, Neville Island, Pa.	66.50	66.50	66.50	63.00	55.00
No. 2 Fdry, Chicago	66.50	66.50	66.50	63.00	55.00
No. 2 Fdry, deld., Phila.	70.91	70.51	70.51	66.76	59.75
No. 2 Fdry, Birm.	62.50	62.50	62.50	59.00	51.38
No. 2 Fdry (Birm.) deld. Cin.	70.20	70.20	70.20	66.70	58.93
Malleable, Valley	66.50	66.50	66.50	63.00	55.00
Malleable, Chicago	66.50	66.50	66.50	63.00	55.00
Ferromanganese, Duquesne	245.00†	245.00†	245.00†	255.00†	228.00*

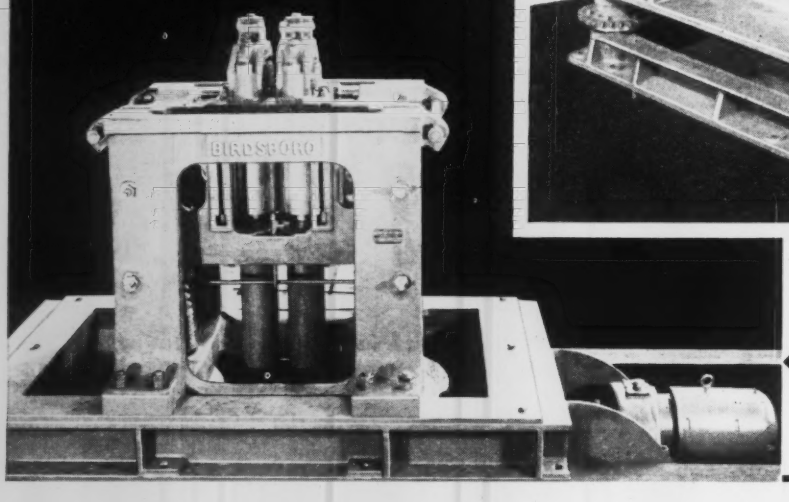
†74-76% Mn, net ton. *75-82% Mn, gross ton, Etna, Pa.

SCRAP, Gross Ton (Including broker's commission)					
No. 1 Heavy Melt, Pittsburgh	$35.50	$34.50	$32.50	$53.50	$44.00
No. 1 Heavy Melt, E. Pa.	38.50	38.50	37.00	58.00	41.50
No. 1 Heavy Melt, Chicago	39.00	39.00	30.50	48.00	42.50
No. 1 Heavy Melt, Valley	37.50	35.50	30.50	53.50	44.00
No. 1 Heavy Melt, Cleve.	33.50	31.50	27.50	51.50	43.00
No. 1 Heavy Melt, Buffalo	28.50	28.50	28.50	53.50	43.00
Rails, Rerolling, Chicago	56.50	54.50	49.50	64.50	52.50
No. 1 Cast, Chicago	42.50	42.50	39.50	45.50	43.00

COKE, Net Ton					
Beehive, Furn., Connlsvl.	$15.25	$15.25	$15.25	$15.00	$14.75
Beehive, Fdry., Connlsvl.	18.25	18.25	18.25	18.00	17.00

design versatility...





▲ VERTICAL MILL with twin motor drive, one motor above the other. Rolls are short sleeves.

◀ VERTICAL MILL with full length roll bodies driven by universal spindles from below. Pinion stand and bevel gear drive are located below the mill.

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Steel Prices

Mill prices as reported to STEEL, Feb. 12, cents per pound except as otherwise noted. *Changes shown in italics.* Code numbers following mill points indicate producing company. Key to producers, page 188; to footnotes, page 190.

SEMIFINISHED

INGOTS, Carbon, Forging (NT)
Munhall,Pa. U5 ....$73.50

INGOTS, Alloy (NT)
Detroit S41 ....$77.00
Farrell,Pa. S3 ....77.00
Lowellville,O. S3 ....77.00
Midland,Pa. C18 ....77.00
Munhall,Pa. U5 ....77.00
Sharon,Pa. S3 ....77.00

BILLETS, BLOOMS & SLABS
Carbon, Rerolling (NT)
Bessemer,Pa. U5 ....$77.50
Buffalo R2 ....77.50
Clairton,Pa. U5 ....77.50
Ensley,Ala. T2 ....77.50
Fairfield,Ala. T2 ....77.50
Fontana,Calif. K1 ....88.00
Gary,Ind. U5 ....77.50
Johnstown,Pa. B3 ....77.50
Lackawanna,N.Y. B2 ..77.50
Munhall,Pa. U5 ....77.50
Owensboro,Ky. G8 ....77.50
S.Chicago,Ill. R2, U5 ..77.50
S.Duquesne,Pa. U5 ....77.50
Sterling,Ill. N15 ....77.50
Youngstown R2 ....77.50

Carbon, Forging (NT)
Bessemer,Pa. U5 ....$96.00
Buffalo R2 ....96.00
Canton,O. R2 ....98.50
Clairton,Pa. U5 ....96.00
Conshohocken,Pa. A3 .101.00
Ensley,Ala. T2 ....96.00
Fairfield,Ala. T2 ....96.00
Fontana,Calif. K1 ....105.50
Gary,Ind. U5 ....96.00
Geneva,Utah C11 ....96.00
Houston S5 ....101.00
Johnstown,Pa. B2 ....96.00
Lackawanna,N.Y. B2 ..96.00
LosAngeles B3 ....105.50
Midland,Pa. C18 ....96.00
Munhall,Pa. U5 ....96.00
Owensboro,Ky. G8 ....96.00
Seattle B3 ....109.50
Sharon,Pa. S3 ....96.00
S.Chicago R2, U5, W14 .96.00
S.Duquesne,Pa. U5 ....96.00
S.SanFrancisco B3 ....105.50
Warren,O. C17 ....96.00

Alloy, Forging (NT)
Bethlehem,Pa. B2 ..$114.00
Bridgeport,Conn. C32..114.00
Buffalo R2 ....114.00
Canton,O. R2, T7 ....114.00
Conshohocken,Pa. A3 .121.00
Detroit S41 ....114.00
Economy,Pa. B14 ....114.00
Farrell,Pa. S3 ....114.00
Fontana,Calif. K1 ....135.00
Gary,Ind. U5 ....114.00
Houston S5 ....119.00
Ind.Harbor,Ind. Y1 ....114.00
Johnstown,Pa. B2 ....114.00
Lackawanna,N.Y. B2 .114.00
LosAngeles B3 ....134.00
Lowellville,O. S3 ....114.00
Massillon,O. R2 ....114.00
Midland,Pa. C18 ....114.00
Munhall,Pa. U5 ....114.00
Owensboro,Ky. G8 ....114.00
Sharon,Pa. S3 ....114.00
S.Chicago R2,U5,W14..114.00
S.Duquesne,Pa. U5 ....114.00
Struthers,O. Y1 ....114.00
Warren,O. C17 ....114.00

ROUNDS, SEAMLESS TUBE (NT)
Buffalo R2 ....$117.50
Canton,O. R2 ....120.00
Cleveland R2 ....117.50
Gary,Ind. U5 ....117.50
S.Chicago,Ill. R2, W14 117.50
S.Duquesne,Pa. U5 ....117.50
Warren,O. C17 ....117.50

SKELP
Aliquippa,Pa. J5 ....5.075
Munhall,Pa. U5 ....4.875
Warren,O. R2 ....4.875
Youngstown R2, U5 ....4.875

WIRE RODS
AlabamaCity,Ala. R2 ....6.15
Aliquippa,Pa. J5 ....6.15
Alton,Ill. L1 ....6.35
Buffalo W12 ....6.15
Cleveland A7 ....6.15
Donora,Pa. A7 ....6.15
Fairfield,Ala. T2 ....6.15
Houston S5 ....6.40
IndianaHarbor,Ind. Y1..6.15
Johnstown,Pa. B2 ....6.15
Joliet,Ill. A7 ....6.15
KansasCity,Mo. S5 ....6.40
Kokomo,Ind. C16 ....6.25
LosAngeles B3 ....6.95
Minnequa,Colo. C10 ....6.40
Monessen,Pa. P7 ....6.15
N.Tonawanda,N.Y. B11..6.15
Pittsburg,Calif. C11 ....6.95
Portsmouth,O. P12 ....6.15
Roebling,N.J. R5 ....6.25
S.Chicago:Ill. R2 ....6.15
SparrowsPoint,Md. B2 ..6.25
Sterling,Ill.(1) N15 ....6.15
Sterling,Ill. N15 ....6.25
Struthers,O. Y1 ....6.15
Worcester,Mass. A7 ....6.45

STRUCTURALS

Carbon Steel Std. Shapes
AlabamaCity,Ala. R2 ..5.275
Atlanta A11 ....5.475
Aliquippa,Pa. J5 ....5.275
Bessemer,Ala. T2 ....5.275
Bethlehem,Pa. B2 ....5.325
Birmingham C15 ....5.275
Clairton,Pa. U5 ....5.275
Fairfield,Ala. T2 ....5.275
Fontana,Calif. K1 ....6.075
Gary,Ind. U5 ....5.275
Geneva,Utah C11 ....5.275
Houston S5 ....5.375
Ind.Harbor,Ind. I-2 ....5.275
Johnstown,Pa. B2 ....5.325
Joliet,Ill. P22 ....5.275
KansasCity,Mo. S5 ....5.375
Lackawanna,N.Y. B2 ..5.325
LosAngeles B3 ....5.975
Minnequa,Colo. C10 ....5.575
Munhall,Pa. U5 ....5.275
Niles,Calif. P1 ....5.925
Phoenixville,Pa. P4 ....5.325
Portland,Oreg. O4 ....6.025
Seattle B3 ....6.025
S.Chicago,Ill. U5, W14 5.275
S.SanFrancisco B3 ....5.925
Sterling,Ill. N15 ....5.275
Torrance,Calif. C11 ....5.975
Weirton,W.Va. W6 ....5.275

Wide Flange
Bethlehem,Pa. B2 ....5.325
Clairton,Pa. U5 ....5.275
Fontana,Calif. K1 ....6.225
IndianaHarbor,Ind. I-2 .5.275
Lackawanna,N.Y. B2 ..5.325
Munhall,Pa. U5 ....5.275
Phoenixville,Pa. P4 ....5.325
S.Chicago,Ill. U5 ....5.275

Alloy Std. Shapes
Aliquippa,Pa. J5 ....6.55
Clairton,Pa. U5 ....6.55
Gary,Ind. U5 ....6.55
Houston S5 ....6.65
KansasCity,Mo. S5 ....6.65
Munhall,Pa. U5 ....6.55
S.Chicago,Ill. U5 ....6.55

H.S., L.A. Std. Shapes
Aliquippa,Pa. J5 ....7.75
Bessemer,Ala. T2 ....7.75
Bethlehem,Pa. B2 ....7.80
Clairton,Pa. U5 ....7.75
Fairfield,Ala. T2 ....7.75
Fontana,Calif. K1 ....8.55
Gary,Ind. U5 ....7.75
Geneva,Utah C11 ....7.75
Houston S5 ....7.85
Ind.Harbor,Ind. I-2, Y1..7.75
Johnstown,Pa. B2 ....7.80
KansasCity,Mo. S5 ....7.85
Lackawanna,N.Y. B2 ..7.80
LosAngeles B3 ....8.45
Munhall,Pa. U5 ....7.75
Seattle B3 ....8.50
S.Chicago,Ill. U5, W14..7.75
S.SanFrancisco B3 ....8.40
Struthers,O. Y1 ....7.75

H.S., L.A. Wide Flange
Bethlehem,Pa. B2 ....7.80
Lackawanna,N.Y. B2 ..7.80
Munhall,Pa. U5 ....7.75
S.Chicago,Ill. U5 ....7.75

PILING

BEARING PILES
Bethlehem,Pa. B2 ....5.325
Lackawanna,N.Y. B2 ..5.325
Munhall,Pa. U5 ....5.275
S.Chicago,Ill. U5 ....5.275

STEEL SHEET PILING
Lackawanna,N.Y. B2 ..6.225
Munhall,Pa. U5 ....6.225
S.Chicago,Ill. U5 ....6.225
Weirton,W.Va. W6 ....6.225

PLATES

PLATES, Carbon Steel
AlabamaCity,Ala. R2 ..5.10
Aliquippa,Pa. J5 ....5.10
Ashland,Ky.(15) A10 ..5.10
Bessemer,Ala. T2 ....5.10
Clairton,Pa. U5 ....5.10
Claymont,Del. C22 ....5.10
Cleveland J5, R2 ....5.20
Coatesville,Pa. L7 ....5.10
Conshohocken,Pa. A3 ..5.20
Ecorse,Mich. G5 ....5.20
Fairfield,Ala. T2 ....5.10
Fontana,Calif.(30) K1 ..5.90
Gary,Ind. U5 ....5.10
Geneva,Utah C11 ....5.10
GraniteCity,Ill. G4 ....5.30
Harrisburg,Pa. P4 ....5.10
Houston S5 ....5.20
Ind.Harbor,Ind. I-2, Y1..5.10
Johnstown,Pa. B2 ....5.10
Lackawanna,N.Y. B2 ..5.10
LoneStar,Tex. L6 ....5.20
Mansfield,O. E6 ....5.10
Minnequa,Colo. C10 ....5.95
Munhall,Pa. U5 ....5.10
Newport,Ky. A2 ....5.10
Pittsburgh J5 ....5.10
Riverdale,Ill. A1 ....5.10
Seattle B3 ....6.00
Sharon,Pa. S3 ....5.10
S.Chicago,Ill. U5, W14..5.10
SparrowsPoint,Md. B2 ..5.10
Sterling,Ill. N15 ....5.10
Steubenville,O. W10 ....5.10
Warren,O. R2 ....5.10
Youngstown U5, Y1 ....5.10

PLATES, Carbon Abras. Resist.
Claymont,Del. C22 ....6.75
Fontana,Calif. K1 ....7.55
Geneva,Utah C11 ....6.75
Houston S5 ....6.85
Johnstown,Pa. B2 ....6.75
SparrowsPoint,Md. B2 ..6.75

PLATES, Wrought Iron
Economy,Pa. B14 ....13.15

PLATES, H.S., L.A.
Aliquippa,Pa. J5 ....7.625
Bessemer,Ala. T2 ....7.625
Clairton,Pa. U5 ....7.625
Claymont,Del. C22 ....7.625
Cleveland J5, R2 ....7.625
Coatesville,Pa. L7 ....7.925
Conshohocken,Pa. A3 ..7.625
Economy,Pa. B14 ....7.625
Ecorse,Mich. G5 ....7.725
Fairfield,Ala. T2 ....7.625
Farrell,Pa. S3 ....7.625
Fontana,Calif.(30) K1 ..8.425
Gary,Ind. U5 ....7.625
Geneva,Utah C11 ....7.625
Houston S5 ....7.725
Ind.Harbor,Ind. I-2, Y1 7.625
Johnstown,Pa. B2 ....7.625
Munhall,Pa. U5 ....7.625
Pittsburgh J5 ....7.625
Seattle B3 ....8.525
Sharon,Pa. S3 ....7.625
S.Chicago,Ill. U5, W14..7.625
SparrowsPoint,Md. B2..7.625
Warren,O. R2 ....7.625
Youngstown U5 ....7.625

PLATES, ALLOY
Aliquippa,Pa. J5 ....7.20
Claymont,Del. C22 ....7.20
Coatesville,Pa. L7 ....7.20
Economy,Pa. B14 ....7.20
Fontana,Calif.(30) K1 ..8.00
Gary,Ind. U5 ....7.20
Houston S5 ....7.30
Ind.Harbor,Ind. Y1 ....7.20
Johnstown,Pa. B2 ....7.20
Lowellville,O. S3 ....7.20
Munhall,Pa. U5 ....7.20
Newport,Ky. A2 ....7.20
Pittsburgh J5 ....7.20
Seattle B3 ....8.10
Sharon,Pa. S3 ....7.20
S.Chicago,Ill. U5, W14 ..7.20
SparrowsPoint,Md. B2 ..7.20
Youngstown Y1 ....7.20

FLOOR PLATES
Cleveland J5 ....6.175
Conshohocken,Pa. A3 ..6.175
Ind.Harbor,Ind. I-2 ....6.175
Munhall,Pa. U5 ....6.175
S.Chicago,Ill. U5 ....6.175

PLATES, Ingot Iron
Ashland c.l.(15) A10 ....5.35
Ashland l.c.l.(15) A10..5.85
Cleveland c.l. R2 ....5.85
Warren,O. c.l. R2 ....5.85

BARS

BARS, Hot-Rolled Carbon (Merchant Quality)
Ala.City,Ala.(9) R2 ...5.425
Aliquippa,Pa.(9) J5 ...5.425
Alton,Ill. L1 ....5.625
Atlanta(9) A11 ....5.625
Bessemer,Ala.(9) T2 ...5.425
Birmingham(9) C15 ...5.425
Buffalo(9) R2 ....5.425
Clairton,Pa.(9) U5 ....5.425
Cleveland(9) R2 ....5.425
Ecorse,Mich.(9) G5 ....5.525
Emeryville,Calif. J7 ....6.175
Fairfield,Ala.(9) T2 ....5.425
Fairless,Pa.(9) U5 ....5.575
Fontana,Calif.(9) K1 ....6.125
Gary,Ind.(9) U5 ....5.425
Houston(9) S5 ....5.675
Ind.Harbor(9) I-2, Y1..5.425
Johnstown,Pa.(9) B2 ...5.425
Joliet,Ill. P22 ....5.425
KansasCity,Mo.(9) S5 ..5.675
Lackawanna(9) B2 ....5.425
LosAngeles(9) B3 ....6.125
Milton,Pa. M18 ....5.575
Minnequa,Colo. C10 ....5.875
Niles,Calif. P1 ....6.125
N.T'wanda,N.Y.(23)B11 5.775
Owensboro,Ky.(9) G8 ..5.425
Pittsburg,Calif.(9) C11 .6.125
Pittsburgh(9) J5 ....5.425
Portland,Oreg. O4 ....6.175
Seattle B3, N14 ....6.175
S.Ch'e'go(9)R2,U5,W14 5.425
S.Duquesne,Pa.(9) U5 ..5.425
S.SanFran.,Calif.(9)B3 6.175
Sterling,Ill.(1)(9) N15..5.425
Sterling,Ill.(9) N15 ....5.525
Struthers,O. Y1 ....5.425
Tonawanda,N.Y. B12 ..5.425
Torrance,Calif.(9) C11. 6.125
Youngstown(9) R2, U5 5.425

BARS, H.R. Leaded Alloy (Including leaded extra)
Warren,O. C17 ....7.475

BARS, Hot-Rolled Alloy
Aliquippa,Pa. J5 ....6.475
Bethlehem,Pa. B2 ....6.475
Bridgeport,Conn. C32 ...6.55
Buffalo R2 ....6.475
Canton,O. R2, T7 ....6.475
Clairton,Pa. U5 ....6.475
Detroit S41 ....6.475
Economy,Pa. B14 ....6.475
Ecorse,Mich. G5 ....6.575
Fairless,Pa. U5 ....6.625
Farrell Pa. S3 ....6.475
Fontana,Calif. K1 ....7.525
Gary,Ind. U5 ....6.475
Houston S5 ....6.725
Ind.Harbor,Ind. I-2, Y1 6.475
Johnstown,Pa. B2 ....6.475
KansasCity,Mo. S5 ....6.725
Lackawanna,N.Y. B2 ..6.475
Lowellville,O. S3 ....6.475
LosAngeles B3 ....7.525
Massillon,O. R2 ....6.475
Midland,Pa. C18 ....6.475
Owensboro,Ky. G8 ....6.475
Pittsburgh J5 ....6.475
Sharon,Pa. S3 ....6.475
S.Chicago R2, U5, W14 6.475
S.Duquesne,Pa. U5 ....6.475
Struthers,O. Y1 ....6.475
Warren,O. C17 ....6.475
Youngstown U5 ....6.475

BARS & SMALL SHAPES, H.R. High-Strength, Low-Alloy
Aliquippa,Pa. J5 ....7.925
Bessemer,Ala. T2 ....7.925
Bethlehem,Pa. B2 ....7.925
Clairton,Pa. U5 ....7.925
Cleveland R2 ....7.925
Ecorse,Mich. G5 ....8.025
Fairfield,Ala. T2 ....7.925
Fontana,Calif. K1 ....8.625
Gary,Ind. U5 ....7.925
Houston S5 ....8.175
Ind.Harbor,Ind. Y1 ....7.925
Johnstown,Pa. B2 ....7.925
KansasCity,Mo. S5 ....8.175
Lackawanna,N.Y. B2 ..7.925
LosAngeles B3 ....8.625
Pittsburgh J5 ....7.925
Seattle B3 ....8.675
S.Chicago,Ill. U5, W14..7.925
S.Duquesne,Pa. U5 ....7.925
S.SanFrancisco B3 ....8.675
Struthers,O. Y1 ....7.925
Youngstown U5 ....7.925

BAR SIZE ANGLES; H.R. Carbon
Bethlehem,Pa.(9) B2 ..5.575
Houston(9) S5 ....5.675
KansasCity,Mo.(9) S5..5.675
Lackawanna(9) B2 ....5.425
Sterling,Ill. N15 ....5.525
Sterling,Ill.(1) N15 ....5.425
Tonawanda,N.Y. B12 ..5.425

BAR SIZE ANGLES; S. Shapes
Aliquippa,Pa. J5 ....5.425
Atlanta A11 ....5.625
Joliet,Ill. P22 ....5.425
Niles,Calif. P1 ....6.125
Pittsburgh J5 ....5.425
Portland,Oreg. O4 ....6.175
SanFrancisco S7 ....6.275
Seattle B3 ....6.175

BAR SHAPES, Hot-Rolled Alloy
Aliquippa,Pa. J5 ....6.55
Clairton,Pa. U5 ....6.55
Gary,Ind. U5 ....6.55
Houston S5 ....6.80
KansasCity,Mo. S5 ....6.80
Pittsburgh J5 ....6.55
Youngstown U5 ....6.55

BARS, C.F., Leaded Alloy (Including leaded extra)
Ambridge,Pa. W18 ....9.925
BeaverFalls,Pa. M12 ....9.925
Camden,N.J. P13 ....10.10
Chicago W18 ....9.925
Cleveland C20 ....9.925
Elyria,O. W8 ....9.925
LosAngeles S30
(Grade A) 11.30
(Grade B) 11.80
LosAngeles P2
(Grade A) 11.40
(Grade B) 11.90
Monaca,Pa. S17 ....9.925
Newark,N.J. W18 ....10.10
SpringCity,Pa. K3 ....10.10
Warren,O. C17 ....9.925

BARS, Cold-Finished Carbon
Ambridge,Pa. W18 ....7.30
BeaverFalls,Pa. M12 R2 .7.30
Birmingham C15 ....7.90
Bridgeport,Conn. C32 ....7.65
Buffalo B5 ....7.35
Camden,N.J. P13 ....7.75
Carnegie,Pa. C12 ....7.30
Chicago W18 ....7.30
Cleveland A7, C20 ....7.30
Detroit B5, P17 ....7.50
Detroit S41 ....7.30
Donora,Pa. A7 ....7.30
Elyria,O. W8 ....7.30
FranklinPark,Ill. N5 ....7.30
Gary,Ind. R2 ....7.30
GreenBay,Wis. F7 ....7.30
Hammond,Ind. J5, L2 ....7.30
Hartford,Conn. R2 ....7.80
Harvey,Ill. B5 ....7.30
LosAngeles(49) S30 ....8.75
LosAngeles P2, R2 ....8.75
Mansfield,Mass. B5 ....7.85
Massillon,O. R2, R8 ....7.30
Midland,Pa. C18 ....7.30
Monaca,Pa. S17 ....7.30
Newark,N.J. W18 ....7.75
NewCastle,Pa.(17) B4 ....7.30
Pittsburgh J5 ....7.30
Plymouth,Mich. P5 ....7.55
Putnam,Conn. W18 ....7.85
Readville,Mass. C14 ....7.85
S.Chicago,Ill. W14 ....7.30
SpringCity,Pa. K3 ....7.75
Struthers,O. Y1 ....7.30
Warren,O. C17 ....7.30
Willimantic,Conn. J5 ....7.80
Waukegan,Ill. A7 ....7.30
Youngstown F3, Y1 ....7.30

BARS, Cold-Finished Carbon (Turned and Ground)
Cumberland,Md.(5) C19 6.55

BARS, Cold Finished Alloy
Ambridge,Pa. W18 ....8.775
BeaverFalls,Pa. M12,R2 8.775
Bethlehem,Pa. B2 ....8.775
Bridgeport,Conn. C32 ..8.925
Buffalo B5 ....8.775
Camden,N.J. P13 ....8.95
Canton,O. T7 ....8.775
Carnegie,Pa. C12 ....8.775
Chicago W18 ....8.775
Cleveland A7, C20 ....8.775
Detroit B5, P17 ....8.975
Detroit S41 ....8.775
Donora,Pa. A7 ....8.775
Elyria,O. W8 ....8.775
FranklinPark,Ill. N5 ....8.775
Gary,Ind. R2 ....8.775
GreenBay,Wis. F7 ....8.775
Hammond,Ind. J5, L2 ....8.775
Hartford,Conn. R2 ....9.075
Harvey,Ill. B5 ....8.775
Lackawanna,N.Y. B2 ....8.775
LosAngeles P2, S30 ....10.75
Mansfield,Mass. B5 ....9.075
Massillon,O. R2, R8 ....8.775
Midland,Pa. C18 ....8.775
Monaca,Pa. S17 ....8.775
Newark,N.J. W18 ....8.95
Plymouth,Mich. P5 ....8.975
S.Chicago,Ill. W14 ....8.775
SpringCity,Pa. K3 ....8.95
Struthers,O. Y1 ....8.775
Warren,O. C17 ....8.775
Waukegan,Ill. A7 ....8.775
Worcester,Mass. A7 ....9.075
Youngstown F3, Y1 ....8.775

BARS, Reinforcing (To Fabricators)

Ala.City,Ala. R2 .....5.425
Atlanta A11 .....5.625
Birmingham C15 .....5.425
Buffalo R2 .....5.425
Cleveland R2 .....5.425
Ecorse,Mich. G5 .....5.775
Emeryville,Calif. J7 ..6.175
Fairfield,Ala. T2 .....5.425
Fairless,Pa. U5 .....5.575
Fontana,Calif. K1 ....6.125
Ft.Worth,Tex.(4)(26)T4 5.875
Gary,Ind. U5 .....5.425
Houston S5 .....5.675
Ind.Harbor,Ind. I-2, Y1 5.425
Johnstown,Pa. B2 ....5.425
Joliet,Ill. P22 .....5.425
KansasCity,Mo. S5 ...5.675
Lackawanna,N.Y. B2 ..5.425
LosAngeles B3 .....6.125
Milton,Pa. M18 .....5.575
Minnequa,Colo. C10 ..5.875
Niles,Calif. P1 .....6.125
Pittsburg,Calif. C11 ..6.125
Pittsburgh J5 .....5.425
Portland,Oreg. O4 ....6.175
SandSprings,Okla. S5 ..5.925
Seattle B3, N14 .....6.175
S.Chicago,Ill. R2 .....5.425
S.Duquesne,Pa. U5 ....5.425
S.SanFrancisco B3 ....6.175
SparrowsPoint,Md. B2 .5.425
Sterling,Ill.(1) N15 ..5.425
Sterling,Ill. N15 .....5.525
Struthers,O. Y1 .....5.425
Tonawanda,N.Y. B12 ..6.00
Torrance,Calif. C11 ...6.125
Youngstown R2, I5 ..5.425

BARS, Reinforcing (Fabricated; to Consumers)

Boston B2, U8 .....7.65
Chicago U8 .....6.91
Cleveland U8 .....6.89
Johnstown,Pa. B2 ....7.08
KansasCity,Mo. S5 ....7.35
Lackawanna,N.Y. B2 ..6.85
Marion,O. P11 .....6.70
Newark,N.J. U8 .....7.55
Philadelphia U8 .....7.38
Pittsburgh J5, U8 ....7.10
Seattle B3, N14 .....7.70
SparrowsPt.,Md. B2 ....7.08
St.Paul U8 .....7.92
Williamsport,Pa. S19 ..7.00

BARS, Wrought Iron

Economy,Pa.(S.R.)B14 14.45
Economy,Pa.(D.R.)B14 18.00
Economy,(Staybolt)B14 18.45

RAIL STEEL BARS

ChicagoHts.(3) C2, I-2 5.325
ChicagoHts.(4)(44) I-2 .5.425
ChicagoHts.(4) C2 ....5.425
Franklin,Pa. (3) F5 ..5.325
Franklin,Pa. (4) F5 ..5.425
JerseyShore,Pa.(3) J8 ..5.30
Marion,O.(3) P11 ....5.325
Tonawanda(3) R12 ...5.325
Tonawanda(4) B12 ....6.00
Williamsport,Pa.(3) S19 5.50

SHEETS

SHEETS, Hot-Rolled Steel (18 Gage and Heavier)

Ala.City,Ala. R2 .....4.925
AllenportPa. P7 .....4.925
Ashland,Ky.(8) A10 ..4.925
Cleveland J5, R2 .....4.925
Conshohocken,Pa. A3 ..4.975
Detroit(8) M1 .....5.025
Ecorse,Mich. G5 .....5.025
Fairfield,Ala. T2 .....4.925
Fairless,Pa. U5 .....4.975
Fontana,Calif. K1 ....5.675
Gary,Ind. U5 .....4.925
Geneva,Utah C11 .....5.025
GraniteCity,Ill. (8)G4..5.125
Ind.Harbor,Ind. I-2, Y1 4.925
Irvin,Pa. U5 .....4.925
Lackawanna,N.Y. B2 ..4.925
Mansfield,O. E6 .....4.925
Munhall,Pa. U5 .....4.925
Newport,Ky.(8) A2 ..4.925
Niles,O. M21, S3 .....4.925
Pittsburg,Calif. C11 ..5.625
Pittsburgh J5 .....4.925
Portsmouth,O. P12 ....4.925
Riverdale,Ill. A1 .....4.925
Sharon,Pa. S3 .....4.925
S.Chicago,Ill. W14 ....4.925
SparrowsPoint,Md. B2 .4.925
Steubenville,O. W10 ..4.925
Warren,O. R2 .....4.925
Weirton,W.Va. W6 ...4.925
Youngstown U5, Y1 ..4.925

SHEETS, H.R.(19 Ga. & Lighter)

Niles,O. M21 ..... 6.05

SHEETS, H.R. Alloy

Gary,Ind. U5 .....8.10
Ind.Harbor,Ind. Y1 ....8.10
Irvin,Pa. U5 .....8.10
Munhall,Pa. U5 .....8.10
Newport,Ky. A2 .....8.10
Youngstown U5, Y1 ...8.10

SHEETS, H.R.(14 Ga. & Heavier) High-Strength, Low-Alloy

Cleveland J5, R2 ....7.275
Conshohocken,Pa. A3 ..7.325
Ecorse,Mich. G5 .....7.375
Fairfield,Ala. T2 .....7.275
Fairless,Pa. U5 .....7.325
Farrell,Pa. S3 .....7.275
Fontana,Calif. K1 ....8.025
Gary,Ind. U5 .....7.275
Ind.Harbor,Ind. I-2, Y1 7.275
Irvin,Pa. U5 .....7.275
Lackawanna (35) B2 ..7.275
Munhall,Pa. U5 .....7.275
Pittsburgh J5 .....7.275
S.Chicago,Ill. U5, W14 7.275
Sharon,Pa. S3 .....7.275
SparrowsPoint(36) B2 .7.275
Warren,O. R2 .....7.275
Weirton,W.Va. W6 ...7.275
Youngstown U5, Y1 ..7.275

SHEETS, Hot-Rolled Ingot Iron (18 Gage and Heavier)

Ashland,Ky.(8) A10 ..5.175
Cleveland R2 .....5.675
Warren,O. R2 .....5.675

SHEETS, Cold-Rolled Ingot Iron

Cleveland R2 .....6.80
Middletown,O. A10 ....6.55
Warren,O. R2 .....6.80

SHEETS, Cold-Rolled Steel (Commercial Quality)

AlabamaCity,Ala. R2 ..6.05
Allenport,Pa. P7 .....6.05
Cleveland J5, R2 .....6.05
Conshohocken,Pa. A3 ..6.10
Detroit M1 .....6.05
Ecorse,Mich. G5 .....6.15
Fairfield,Ala. T2 .....6.05
Fairless,Pa. U5 .....6.10
Follansbee,W.Va. F4 ..6.05
Fontana,Calif. K1 ....7.30
Gary,Ind. U5 .....6.05
GraniteCity,Ill. G4 ....6.25
Ind.Harbor,Ind. I-2, Y1 6.05
Irvin,Pa. U5 .....6.05
Lackawanna,N.Y. B2 ..6.05
Mansfield,O. E6 .....6.05
Middletown,O. A10 ....6.05
Newport,Ky. A2 .....6.05
Pittsburg,Calif. C11 ....7.00
Pittsburgh J5 .....6.05
Portsmouth,O. P12 ....6.05
SparrowsPoint,Md. B2 ..6.05
Steubenville,O. W10 ....6.05
Warren,O. R2 .....6.05
Weirton,W.Va. W6 ....6.05
Yorkville,O. W10 .....6.05
Youngstown Y1 .....6.05

SHEETS, Cold-Rolled High-Strength, Low-Alloy

Cleveland J5, R2 .....8.975
Ecorse,Mich. G5 .....9.075
Fairless,Pa. U5 .....9.025
Fontana,Calif. K1 ....10.275
Gary,Ind. U5 .....8.975
IndianaHarbor,Ind. Y1 8.975
Irvin,Pa. U5 .....8.975
Lackawanna(37) B2 ..8.975
Pittsburgh J5 .....8.975
SparrowsPoint (38) B2 8.975
Warren,O. R2 .....8.975
Weirton,W.Va. W6 ....8.975
Youngstown Y1 .....8.975

SHEETS, Culvert

	Cu Steel	Cu Fe
Ashland,Ky. A10	6.95	7.20
Canton,O. R2	6.95	7.45
Fairfield T2	6.95	7.20
Gary,Ind. U5	6.95	7.20
GraniteCity,Ill. G4	7.15	...
Ind.Harbor I-2	6.95	7.20
Irvin,Pa. U5	6.95	7.20
Kokomo,Ind. C16	7.05	...
MartinsFry. W10	6.95	7.20
Pitts.,Calif. C11	7.70	...
Pittsburgh J5	6.95	...
SparrowsPt. B2	6.95	...

SHEETS, Culvert—Pure Iron

Ind.Harbor,Ind. I-2 .. 7.20

SHEETS, Galvanized Steel Hot-Dipped

Ala.City,Ala. R2 .....6.60‡
Ashland,Ky. A10 .....6.60†
Canton,O. R2 .....6.60‡
Dover,O. E6 .....6.60†
Fairfield,Ala. T2 .....6.60†
Gary,Ind. U5 .....6.60*
GraniteCity,Ill. G4 ....6.80*
Ind.Harbor,Ind. I-2 ...6.60†
Irvin,Pa. U5 .....6.60*
Kokomo,Ind. C16 ....6.70‡
MartinsFerry,O. W10 ..6.60*
Middletown,O. A10 ....6.60†
Pittsburg,Calif. C11 ...7.35*
Pittsburgh J5 .....6.60†
SparrowsPt.,Md. B2 ..6.60†
Warren,O. R2 .....6.60†
Weirton,W.Va. W6 ....6.60*

*Continuous and noncontinuous. †Continuous. ‡Noncontinuous.

SHEETS, Well Casing

Fontana,Calif. K1 ....7.175

SHEETS, Galvanized High-Strength, Low-Alloy

Irvin,Pa. U5 .....9.725
SparrowsPt.(39) B2 ..9.725

SHEETS, Galvannealed Steel

Canton,O. R2 .....7.00
Irvin,Pa. U5 .....7.00

SHEETS, Galvanized Ingot Iron (Hot-Dipped Continuous)

Ashland,Ky. A10 .....6.85
Middletown,O. A10 ....6.85

SHEETS, Electrogalvanized

Cleveland (28) R2 ....7.425
Niles,O. (28) R2 ....7.425
Youngstown Y1 .....7.275
Weirton,W.Va. W6 ..7.275

SHEETS, Aluminum Coated

Butler,Pa. A10 (type 1) .9.25
Butler,Pa. A10 (type 2) .9.35

SHEETS, Enameling Iron

Ashland,Ky. A10 .....6.625
Cleveland R2 .....6.625
Gary,Ind. U5 .....6.625
GraniteCity,Ill. G4 ....6.825
Ind.Harbor,Ind. I-2, Y1 6.625
Irvin,Pa. U5 .....6.625
Middletown,O. A10 ....6.625
Niles,O. M21, S3 ....6.625
Youngstown Y1 .....6.625

BLUED STOCK, 29 Gage

Follansbee,W.Va. F4 ..8.65
Ind.Harbor,Ind. I-2 ..8.475
Yorkville,O. W10 ....8.475

SHEETS, Long Terne Steel (Commercial Quality)

BeechBottom,W.Va.W10 7.00
Gary,Ind. U5 .....7.00
Mansfield,O. E6 .....7.00
Middletown,O. A10 ....7.00
Niles,O. M21, S3 .....7.00
Warren,O. R2 .....7.00
Weirton,W.Va. W6 ....7.00

SHEETS, Long Terne, Ingot Iron

Middletown,O. A10 ....7.40

Key to Producers

A2 Acme Steel Co.
A2 Acme-Newport Steel Co.
A3 Alan Wood Steel Co.
A4 Allegheny Ludlum Steel
A5 Alloy Metal Wire Div., H. K. Porter Co. Inc.
A8 American Shim Steel Co.
AF American Steel & Wire Div., U. S. Steel Corp.
A8 Anchor Drawn Steel Co.
A9 Angell Nail & Chaplet
A10 Armco Steel Corp.
A11 Atlantic Steel Co.

B1 Babcock & Wilcox Co.
B2 Bethlehem Steel Co.
B3 Beth. Pac. Coast Steel
B4 Blair Strip Steel Co.
B5 Bliss & Laughlin Inc.
B8 Braeburn Alloy Steel
B9 Brainard Steel Div., Sharon Steel Corp.
B10 E. & G. Brooke, Wickwire Spencer Steel Div., Colo. Fuel & Iron
B11 Buffalo Bolt Co., Div., Buffalo Eclipse Corp.
B12 Buffalo Steel Corp.
B14 A. M. Byers Co.
B15 J. Bishop & Co.

C1 Calstrip Steel Corp.
C2 Calumet Steel Div., Borg-Warner Corp.
C4 Carpenter Steel Co.
C9 Colonial Steel Co.
C10 Colorado Fuel & Iron
C11 Columbia-Geneva Steel
C12 Columbia Steel & Shaft.
C13 Columbia Tool Steel Co.
C14 Compressed Steel Shaft.
C15 Connors Steel Div., H. K. Porter Co. Inc.
C16 Continental Steel Corp.
C17 Copperweld Steel Co.
C18 Crucible Steel Co.
C19 Cumberland Steel Co.
C20 Cuyahoga Steel & Wire
C22 Claymont Plant, Wickwire Spencer Steel Div., Colo. Fuel & Iron
C23 Charter Wire Inc.
C24 G. O. Carlson Inc.
C32 Carpenter Steel of N.Eng.

D2 Detroit Steel Corp.
D3 Dearborn Div., Sharon Steel Corp.
D4 Disston Div., H. K. Porter Co. Inc.
D6 Driver-Harris Co.
D7 Dickson Weatherproof Nail Co.
D8 Damascus Tube Co.
D9 Wilbur B. Driver Co.

E1 Eastern Gas & Fuel Assoc.
E2 Eastern Stainless Steel
E4 Electro Metallurgical Co.
E5 Elliott Bros. Steel Co.
E6 Empire-Reeves Steel Corp.

F2 Firth Sterling Inc.
F3 Fitzsimmons Steel Co.
F4 Follansbee Steel Corp.
F5 Franklin Steel Div., Borg-Warner Corp.
F6 Fretz-Moon Tube Co.
F7 Ft. Howard Steel & Wire
F8 Ft. Wayne Metals Inc.

G4 Granite City Steel Co.
G5 Great Lakes Steel Corp.
G6 Greer Steel Co.
G8 Green River Steel Corp.

H1 Hanna Furnace Corp.
H7 Helical Tube Co.

I-1 Igoe Bros. Inc.
I-2 Inland Steel Co.
I-3 Interlake Iron Corp.
I-4 Ingersoll Steel Div., Borg-Warner Corp.
I-6 Ivins Steel Tube Works
I-7 Indiana Steel & Wire Co.

J1 Jackson Iron & Steel Co.
J3 Jessop Steel Co.
J4 Johnson Steel & Wire Co.
J5 Jones & Laughlin Steel
J6 Joslyn Mfg. & Supply
J7 Judson Steel Corp.
J8 Jersey Shore Steel Co.

K1 Kaiser Steel Corp.
K2 Keokuk Electro-Metals
K3 Keystone Drawn Steel
K4 Keystone Steel & Wire
K7 Kenmore Metals Corp.

L1 Laclede Steel Co.
L2 LaSalle Steel Co.
L3 Latrobe Steel Co.
L6 Lone Star Steel Co.
L7 Lukens Steel Co.

M1 McLouth Steel Corp.
M4 Mahoning Valley Steel
M6 Mercer Pipe Div., Sawhill Tubular Products
M8 Mid-States Steel & Wire
M12 Moltrup Steel Products
M14 McInnes Steel Co.
M16 Md.Fine & Special Wire
M17 Metal Forming Corp.
M18 Milton Steel Div., Merritt-Chapman & Scott
M21 Mallory-Sharon Metals Corp.
M22 Mill Strip Products Co.

N1 National-Standard Co.
N2 National Supply Co.
N3 National Tube Div., U. S. Steel Corp.
N5 Nelsen Steel & Wire Co.
N6 New England High Carbon Wire Co.
N8 Newman-Crosby Steel
N9 Newport Steel Corp.
N14 Northwest. Steel Rolling Mills Inc.
N15 Northwestern S.&W. Co.

O4 Oregon Steel Mills

P1 Pacific States Steel Corp.
P2 Pacific Tube Co.
P4 Phoenix Iron & Steel Co., Sub. of Barium Steel Corp.
P5 Pilgrim Drawn Steel
P6 Pittsburgh Coke & Chem.
P7 Pittsburgh Steel Co.
P11 Pollak Steel Co.
P12 Portsmouth Div., Detroit Steel Corp.
P13 Precision Drawn Steel
P14 Pitts. Screw & Bolt Co.
P15 Pittsburgh Metallurgical
P16 Page Steel & Wire Div., Amer. Chain & Cable
P17 Plymouth Steel Corp.
P19 Pitts. Rolling Mills
P20 Prod. Steel Strip Corp.
P22 Phoenix Mfg. Co.
P24 Phil. Steel & Wire Corp.

R2 Republic Steel Corp.
R3 Rhode Island Steel Corp.
R5 Roebling's Sons, John A.
R6 Rome Strip Steel Co.
R8 Reliance Div., Eaton Mfg.
R9 Rome Mfg. Co.
R10 Rodney Metals Inc.

S1 Seneca Wire & Mfg. Co.
S3 Sharon Steel Corp.
S4 Sharon Tube Co.
S5 Sheffield Div., Armco Steel Corp.
S6 Shenango Furnace Co.
S7 Simmons Co.
S8 Simonds Saw & Steel Co.
S12 Spencer Wire Corp.
S13 Standard Forgings Corp.
S14 Standard Tube Co.
S15 Stanley Works
S17 Superior Drawn Steel Co.
S18 Superior Steel Div., Copperweld Steel Co.
S19 Sweet's Steel Co.
S20 Southern States Steel
S23 Superior Tube Co.
S25 Stainless Welded Prod.
S26 Specialty Wire Co. Inc.
S30 Sierra Drawn Steel Corp.
S40 Seneca Steel Service
S41 Stainless Steel Div., J&L Steel Corp.
S42 Southern Elec. Steel Co.

T2 Tenn. Coal & Iron Div., U. S. Steel Corp.
T3 Tenn. Products & Chemical Corp.
T4 Texas Steel Co.
T5 Thomas Strip Div., Pittsburgh Steel Co.
T6 Thompson Wire Co.
T7 Timken Roller Bearing
T9 Tonawanda Iron Div., Am. Rad. & Stan. San.
T13 Tube Methods Inc.
T19 Techalloy Co. Inc.

U4 Universal-Cyclops Steel
U5 United States Steel Corp.
U6 U. S. Pipe & Foundry
U7 Ulbrich Stainless Steels
U8 U. S. Steel Supply Div., U. S. Steel Corp.

V2 Vanadium-Alloys Steel
V3 Vulcan Crucible Steel Div., H. K. Porter Co.

W1 Wallace Barnes Co.
W2 Wallingford Steel Co.
W3 Washburn Wire Co.
W4 Washington Steel Corp.
W6 Weirton Steel Co.
W8 Western Automatic Machine Screw Co.
W9 Wheatland Tube Co.
W10 Wheeling Steel Corp.
W12 Wickwire Spencer Steel Div., Colo. Fuel & Iron
W13 Wilson Steel & Wire Co.
W14 Wisconsin Steel Div., International Harvester
W15 Woodward Iron Co.
W18 Wyckoff Steel Co.

Y1 Youngstown Sheet & Tube

STRIP

STRIP, Hot-Rolled Carbon

Ala.City,Ala.(27) R2 ..4.925
Allenport,Pa. P7 .....4.925
Alton,Ill. L1 .....5.125
Ashland,Ky.(8) A10 ..4.925
Atlanta A11 .....5.125
Bessemer,Ala. T2 ....4.925
Birmingham C15 .....4.925
Buffalo (27) R2 .....4.925
Conshohocken,Pa. A3 ..4.975
Detroit M1 .....5.025
Ecorse,Mich. G5 .....5.025
Fairfield,Ala. T2 .....4.925
Fontana,Calif. K1 ....5.675
Gary,Ind. U5 .....4.925
Ind.Harbor,Ind. I-2, Y1 4.925
Johnstown,Pa. (25) B2..4.925
Lackaw'na,N.Y.(25) B2 4.925
LosAngeles(25) B3 ....5.675
Minnequa,Colo. C10 ...6.025
Riverdale,Ill. A1 .....4.925
SanFrancisco S7 .....6.35
Seattle(25) B3 .....5.925
Seattle N14 .....6.35
Sharon,Pa. S3 .....4.925
S.Chicago W14 .....4.925
S.SanFrancisco(25) B3 5.675
SparrowsPoint,Md. B2 4.925
Sterling,Ill. (1) N15 ..4.925
Sterling,Ill. N15 .....5.025
Torrance,Calif. C11 ..5.675
Warren,O. R2 .....4.925
Weirton,W.Va. W6 ....4.925
Youngstown U5 .....4.925

STRIP, Hot-Rolled Alloy

Carnegie,Pa. S18 .....8.10
Farrell,Pa. S3 .....8.10
Gary,Ind. U5 .....8.10
Houston S5 .....8.35
Ind.Harbor,Ind. Y1 ....8.10
KansasCity,Mo. S5 ....8.35
LosAngeles B3 .....9.30
Lowellville,O. S3 .....8.10
Newport,Ky. A2 .....8.10
Sharon,Pa. A2, S3 .....8.10
S.Chicago,Ill. W14 ....8.10
Youngstown U5, Y1 ...8.10

STRIP, Hot-Rolled High-Strength, Low-Alloy

Bessemer,Ala. T2 ....7.325
Conshohocken,Pa. A3 ..7.325
Ecorse,Mich. G5 .....7.425
Fairfield,Ala. T2 .....7.325
Farrell,Pa. S3 .....7.325
Gary,Ind. U5 .....7.325
Ind.Harbor,Ind. I-2, Y1 7.325
Lackawanna,N.Y. B2..7.325
LosAngeles(25) B3 ....8.075
Seattle(25) B3 .....8.325
Sharon,Pa. S3 .....7.325
S.Chicago,Ill. W14 ....7.325
S.SanFrancisco(25)B3 ..8.075
SparrowsPoint,Md. B2..7.325
Warren,O. R2 .....7.325
Weirton,W.Va. W6 ....7.325
Youngstown U5, Y1 ..7.325

STRIP, Hot-Rolled Ingot Iron

Ashland,Ky.(8) A10 ..5.175
Warren,O. R2 .....5.675

STRIP, Cold-Rolled Carbon

Anderson,Ind. G6 .....7.15
Baltimore T6 .....7.15
Boston T6 .....7.70
Buffalo S40 .....7.15
Cleveland A7, J5 .....7.15
Conshohocken,Pa. A3 ..7.20
Dearborn,Mich. D3 .....7.25
Detroit D2, M1, P20 ..7.25
Dover,O. G6 .....7.15
Ecorse,Mich. G5 .....7.25
Evanston,Ill. M22 .....7.25
Follansbee,W.Va. F4 ..7.15
Fontana,Calif. K1 ....9.00
FranklinPark,Ill. T6 ..7.25
Ind.Harbor, Ind. Y1 ....7.15
Indianapolis J5 .....7.30
LosAngeles J5 .....9.05
LosAngeles C1 .....9.20
NewBedford,Mass. R10 ..7.60
NewBritain(10) S15 ....7.15
NewCastle,Pa. B4, E5 ..7.15
NewHaven,Conn. D2 ....7.60
NewKensington,Pa. A6 ..7.15
Pawtucket,R.I. R3 .....7.80
Pawtucket,R.I. N8 .....7.70
Philadelphia(45) P24 ...7.70
Pittsburgh J5 .....7.15
Riverdale,Ill. A1 .....7.25
Rome,N.Y. (32) R6 ...7.15
Sharon,Pa. S3 .....7.15
Trenton,N.J. (31) R5..8.60
Wallingford,Conn. W2 ..7.60
Warren,O. R2, T5 .....7.15
Weirton,W.Va. W6 ....7.15
Worcester,Mass. A7 ....7.70
Youngstown J5, Y1 ... 7.15

STRIP, Cold-Rolled Alloy

Boston T6 .....15.40
Carnegie,Pa. S18 .....15.05
Cleveland A7 .....15.05
Dover,O. G6 .....15.05
Farrell,Pa. S3 .....15.05
FranklinPark,Ill. T6 ..15.05
Harrison,N.J. C18 ....15.05
Indianapolis J5 .....15.20
Lowellville,O. S3 .....15.05
Pawtucket,R.I. N8 ....15.40
Riverdale,Ill. A1 .....15.05
Sharon,Pa. S3 .....15.05
Worcester,Mass. A7 ...15.35
Youngstown J5 .....15.05

STRIP, Cold-Rolled High-Strength, Low-Alloy

Cleveland A7 .....10.45
Dearborn,Mich. D3 ....10.60
Dover,O. G6 .....10.45
Ecorse,Mich. G5 .....10.60
Farrell,Pa. S3 .....10.50
Ind.Harbor,Ind. Y1 ...10.65
Sharon,Pa. S3 .....10.50
Warren,O. R2 .....10.45

STRIP, Cold-Finished Spring Steel (Annealed)	0.26-0.40C	0.41-0.60C	0.61-0.80C	0.81-1.05C	1.06-1.35C
Baltimore T6	9.50	10.70	12.90	15.90	18.85
Boston T6	9.50	10.70	12.90	15.90	18.85
Bristol,Conn. W1	...	10.70	12.90	16.10	19.30
Carnegie,Pa. S18	8.95	10.40	12.60	15.60	....
Cleveland A7	8.95	10.40	12.60	15.60	18.55
Dearborn,Mich. D3	9.05	10.50	12.70	....	....
Detroit D2	9.05	10.50	12.70	15.70	....
Dover,O. G6	8.95	10.40	12.60	15.60	18.55
Evanston,Ill. M22	8.95	10.40	12.60	15.60	....
Fostoria,O. S1	10.05	10.40	12.60	15.60	....
FranklinPark,Ill. T6	9.05	10.40	12.60	15.60	18.55
Harrison,N.J. C18	...	...	12.90	16.10	19.30
Indianapolis J5	9.10	10.55	12.60	15.60	18.55
LosAngeles C1	11.15	12.60	14.80	17.80	....
LosAngeles J5	11.15	12.60	14.80	....	....
NewBritain,Conn.(10) S15.	8.95	10.40	12.60	15.60	18.55
NewCastle,Pa. B4, E5	8.95	10.40	12.60	15.60	....
NewHaven,Conn. D2	9.40	10.70	12.90	15.90	....
NewKensington,Pa. A6	8.95	10.40	12.60	15.60	....
New York W3	...	10.70	12.90	16.10	19.30
Pawtucket,R.I. N8	9.50	10.70	12.90	15.90	18.85
Riverdale,Ill. A1	9.05	10.40	12.60	15.60	18.55
Rome,N.Y.(32) R6	8.95	10.40	12.60	15.60	18.55
Sharon,Pa. S3	8.95	10.40	12.60	15.60	18.55
Trenton,N.J. R5	...	10.70	12.90	16.10	19.30
Wallingford,Conn. W2	9.40	10.70	12.90	15.90	18.75
Warren,O. T5	8.95	10.40	12.60	15.60	18.55
Worcester,Mass. A7, T6	9.50	10.70	12.90	15.90	18.85
Youngstown J5	8.95	10.40	12.60	15.60	18.55

Spring Steel (Tempered)	Up to 0.80C	0.81-1.05C	1.06-1.35C
Bristol,Conn. W1	18.10	21.95	26.30
Buffalo W12	18.10	....	....
Fostoria,O. S1	18.30	22.15	....
FranklinPark,Ill. T6	18.45	22.30	26.65
Harrison,N.J. C18	18.10	21.95	26.30
New York W3	18.10	21.95	26.30
Palmer,Mass. W12	18.10	....	....
Trenton,N.J. R5	18.10	21.95	26.30
Worcester,Mass. A7, T6	18.10	21.95	26.30
Youngstown J5	18.45	22.30	26.65

STRIP, Galvannealed (Continuous)

Sharon,Pa. S3 .....7.275

TIGHT COOPERAGE HOOP

Atlanta A11 .....5.65
Riverdale,Ill. A1 .....5.50
Sharon,Pa. S3 .....5.35
Youngstown U5 .....5.35

STRIP, Cold-Rolled Ingot Iron

Warren,O. R2 .....7.90

STRIP, C.R. Electrogalvanized

Cleveland A7 .....7.15*
Dover,O. G6 .....7.15*
Evanston,Ill. M22 .....7.25*
Riverdale,Ill. A1 .....7.25*
Warren,O. B9, T5 ....7.15*
Worcester,Mass. A7 ....7.70*
Youngstown J5 .....7.15*

*Plus galvanizing extras.

SILICON STEEL

H.R.SHEETS(22 Ga.,cut lengths)	Field	Armature	Electric	Motor	Dynamo
BeechBottom,W.Va. W10	....	....	11.80	12.90	13.95
Mansfield,O. E6	9.625	11.10	11.80	12.90	13.95
Newport,Ky. A2	9.625	11.10	11.80	12.90	13.95
Niles,O. M21, S3	9.625	11.10	11.80	12.90	....
Vandergrift,Pa. U5	....	11.10	11.80	12.90	13.95
Warren,O. R2	9.625	11.10	11.80	12.90	....
Zanesville,O. A10	....	11.10	11.80	12.90	13.95
Zanesville,O. A10 (SP Coils)	....	....	11.55	12.65	13.70

C.R. COILS & CUT LENGTHS (22 Ga.)

Fully Processed (Semiprocessed ½c lower)	Field	Armature	Electric	Motor	Dynamo
BeechBottom,W.Va. W10.	....	11.35	12.05	13.15	14.20
Brakenridge,Pa. A4	....	....	12.05	13.15	14.20
GraniteCity,Ill. G4	9.625*	11.05*	11.75*	12.85*	....
IndianaHarbor,Ind. I-2	9.625†	10.85*	11.55*	12.65*	....
Mansfield,O. E6	9.625*	11.35	12.05	13.15	14.20
Vandergrift,Pa. U5	9.625*	11.35	12.05	13.15	14.20
Warren,O. R2	9.625*	11.35	12.05	13.15	14.20
Zanesville,O. A10(FP Coils)	....	11.35	12.05	13.15	14.20
Vandergrift,Pa. U5	....	....	....	....	Stator 7.85

H.R. SHEETS (22Ga., cut lengths)	Transformer Grades T-72	T-65	T-58	T-52
BeechBottom,W.Va. W10	15.00	15.55	16.05	17.10
Vandergrift,Pa. U5	15.00	15.55	16.05	17.10
Zanesville,O. A10	15.00	15.55	16.05	17.10

C.R. COILS & CUT LENGTHS (22 Ga.)	Grain Oriented T-100	T-90	T-80	T-73	T-66	T-72
Brakenridge,Pa. A4	....	17.60	19.20	19.70	20.20	15.25††
Butler,Pa. A10	....	....	19.20	19.70	20.20	....
Vandergrift,Pa. U5	16.60	17.60	19.20	19.70	20.20	15.25**
Warren,O. R2	....	....	....	....	....	15.25‡

*Semiprocessed. †Fully processed only. ‡Coils, annealed, semiprocessed ½c lower. **Cut lengths, ¾-cent lower. ††Coils only.

TIN MILL PRODUCTS

TIN PLATE, Electrolytic (Base Box)	0.25 lb	0.50 lb	0.75 lb
Aliquippa,Pa. J5	$8.75	$9.00	$9.40
Fairfield,Ala. T2	8.85	9.10	9.50
Fairless,Pa. U5	8.85	9.10	9.50
Fontana,Calif. K1	9.50	9.75	10.15
Gary,Ind. U5	8.75	9.00	9.40
GraniteCity,Ill. G4	8.85	9.10	9.50
IndianaHarbor,Ind. I-2, Y1	8.75	9.00	9.40
Irvin,Pa. U5	8.75	9.00	9.40
Niles,O. R2	8.75	9.00	9.40
Pittsburg,Calif. C11	9.50	9.75	10.15
SparrowsPoint,Md. B2	8.85	9.10	9.50
Weirton,W.Va. W6	8.75	9.00	9.40
Yorkville,O. W10	8.75	9.00	9.40

ELECTROTIN (22-27 Gage; Dollars per 100 lb)			
Aliquippa,Pa. J5	7.725	7.925	....
Niles,O. R2	7.725	7.925	8.125

TIN PLATE, American	1.25 lb	1.50 lb
Aliquippa,Pa.J5	$10.05	$10.30
Fairfield,Ala. T2	10.15	10.40
Fairless,Pa. U5	10.15	10.40
Fontana,Calif.K1	10.80	11.05
Gary,Ind. U5	10.05	10.30
Irvin,Pa. U5	10.05	10.30
Pitts.,Calif. C11	10.80	11.05
Sp.Pt.,Md. B2	10.15	10.40
Weirton,W.Va.W6	10.05	10.30
Yorkville,O. W10	10.05	10.30

BLACK PLATE (Base Box)

Aliquippa,Pa. J5 .....$7.85
Fairfield,Ala. T2 .....7.95
Fairless,Pa. U5 .....7.95
Fontana,Calif. K1 .....8.60
Gary,Ind. U5 .....7.85
GraniteCity,Ill. G4 ....7.95
Ind.Harbor,Ind. I-2,Y1 ..7.85
Irvin,Pa. U5 .....7.85
Niles,O. R2 .....7.85
Pittsburg,Calif. C11 ....8.60
SparrowsPoint,Md. B2..7.95
Weirton,W.Va. W6 ....7.85
Yorkville,O. W10 .....7.85

HOLLOWARE ENAMELING Black Plate (29 Gage)

Aliquippa,Pa. J5 .....$7.50
Gary,Ind. U5 .....7.50
GraniteCity,Ill. G4 ....7.60
Ind.Harbor,Ind. Y1 ....7.50
Irvin,Pa. U5 .....7.50
Yorkville,O. W10 .....7.50

MANUFACTURING TERNES (Special Coated, Base Box)

Gary,Ind. U5 .....$9.70
Irvin,Pa. U5 .....9.70

ROOFING SHORT TERNES (8 lb Coated, Base Box)

Gary,Ind. U5 .....$11.25

WIRE

WIRE, Manufacturers Bright, Low Carbon

AlabamaCity,Ala. R2 ..7.65
Aliquippa,Pa. J5 .....7.65
Alton,Ill. L1 .....7.85
Atlanta A11 .....7.85
Bartonville,Ill. K4 ....7.75
Buffalo W12 .....7.65
Chicago W13 .....7.65
Cleveland A7, C20 ....7.65
Crawfordsville,Ind. M8..7.75
Donora,Pa. A7 .....7.65
Duluth A7 .....7.65
Fairfield,Ala. T2 .....7.65
Fostoria,O.(24) S1 ....7.75
Houston S5 .....7.90
Jacksonville,Fla. M8 ...8.00
Johnstown,Pa. B2 .....7.65
Joliet,Ill. A7 .....7.65
KansasCity,Mo. S5 ....7.90
Kokomo,Ind. C16 .....7.75
LosAngeles B3 .....8.60
Minnequa,Colo. C10 ....7.90
Monessen,Pa. P7, P16 ..7.65
N.Tonawanda,N.Y. B11 7.65
Palmer,Mass. W12 .....7.95
Pittsburg,Calif. C11 ....8.60
Portsmouth,O. P12 ....7.65
Rankin,Pa. A7 .....7.65
S.Chicago,Ill. R2 .....7.65
S.SanFrancisco C10 .....8.60
SparrowsPoint,Md. B2 ..7.75
Sterling,Ill.(1) N15 .....7.65
Sterling,Ill. N15 .....7.75
Struthers,O. Y1 .....7.65
Waukegan,Ill. A7 .....7.65
Worcester,Mass. A7 ....7.95

WIRE, Gal'd ACSR for Cores

Bartonville,Ill. K4 ....12.65
Buffalo W12 .....12.65
Cleveland A7 .....12.65
Donora,Pa. A7 .....12.65
Duluth A7 .....12.65
Johnstown,Pa. B2 ....12.65
Minnequa,Colo. C10 ..12.775
Monessen,Pa. P16 ....12.65
Muncie,Ind. I-7 .....12.85
NewHaven,Conn. A7 ..12.95
Palmer,Mass. W12 ....12.95
Pittsburg,Calif. C11 ..13.45
Portsmouth,O. P12 ....12.65
Roebling,N.J. R5 ....12.95
SparrowsPt.,Md. B2 ..12.75
Struthers,O. Y1 .....12.65
Trenton,N.J. A7 .....12.95
Waukegan,Ill. A7 .....12.65
Worcester,Mass. A7 ....12.95

WIRE, Upholstery Spring

Aliquippa,Pa. J5 .....9.30
Alton,Ill. L1 .....9.50
Buffalo W12 .....9.30
Cleveland A7 .....9.30
Donora,Pa. A7 .....9.30
Duluth A7 .....9.30
Johnstown,Pa. B2 .....9.30
KansasCity,Mo. S5 ....9.55
LosAngeles B3 .....10.25
Minnequa,Colo. C10 ....9.50
Monessen,Pa. P7, P16 ..9.30
NewHaven,Conn. A7 ..9.60
Palmer,Mass. W12 ....9.60
Pittsburg,Calif. C11 ..10.25
Portsmouth,O. P12 ....9.30
Roebling,N.J. R5 .....9.60
S.Chicago,Ill. R2 .....9.30
S.SanFrancisco C10 ..10.25
SparrowsPt.,Md. B2 ...9.40
Struthers,O. Y1 .....9.30
Trenton,N.J. A7 .....9.60
Waukegan,Ill. A7 .....9.30
Worcester,Mass. A7 ....9.60

WIRE, MB Spring, High-Carbon

Aliquippa,Pa. J5 .....9.30
Alton,Ill. L1 .....9.50
Bartonville,Ill. K4 .....9.40
Buffalo W12 .....9.30
Cleveland A7 .....9.30
Donora,Pa. A7 .....9.30
Duluth A7 .....9.30
Fostoria,O. S1 .....9.35
Johnstown,Pa. B2 .....9.30
KansasCity,Mo. S5 ....9.55
LosAngeles B3 .....10.25
Milbury,Mass.(12) N6 ..9.60
Minnequa,Colo. C10 ...9.50
Monessen,Pa. P7, P16..9.30
Muncie,Ind. I-7 .....9.50
Palmer,Mass.(12) W12.9.60
Pittsburg,Calif. C11 ..10.25
Portsmouth,O. P12 ....9.30
Roebling,N.J. R5 .....9.60
S.Chicago,Ill. R2 .....9.30
S.SanFrancisco C10 ..10.25
SparrowsPt.,Md. B2 ...9.40
Struthers,O. Y1 .....9.30
Trenton,N.J. A7 .....9.60
Waukegan,Ill. A7 .....9.30
Worcester A7, J4, T6 ..9.60

WIRE, Fine & Weaving(8" Coils)

Alton,Ill. L1 .....15.80
Bartonville,Ill. K4 ....15.70
Buffalo W12 .....15.60
Chicago W13 .....15.60
Cleveland A7 .....15.60
Crawfordsville,Ind. M8..15.70
Fostoria,O. S1 .....15.60
Houston S5 .....15.85
Jacksonville,Fla. M8 ...15.95
Johnstown,Pa. B2 .....15.60
KansasCity,Mo. S5 ....15.85
Kokomo,Ind. C16 .....15.60
Minnequa,Colo. C10 ....15.85
Monessen,Pa. P7, P16..15.60
Muncie,Ind. I-7 .....15.80
Palmer,Mass. W12 .....15.90
S.SanFrancisco C10 ..16.45
Waukegan,Ill. A7 .....15.60
Worcester,Mass. A7, T6 15.90

ROPE WIRE (A)

Bartonville,Ill. K4 ....12.75
Buffalo W12 .....12.75
Fostoria,O. S1 .....12.75
Johnstown,Pa. B2 .....12.75
Monessen,Pa. P7 .....12.75
Muncie,Ind. I-7 .....12.95
Palmer,Mass. W12 ....13.05
Portsmouth,O. P12 ....12.75
Roebling,N.J. R5 .....13.05
SparrowsPt.,Md. B2 ..12.85
Struthers,O. Y1 .....12.75
Worcester,Mass. J4 ....13.05

(A) Plow and Mild Plow; add 0.25c for Improved Plow

WIRE, Tire Bead

Bartonville,Ill. K4	16.55
Monessen,Pa. P16	16.55
Roebling,N.J. R5	17.05

WIRE, Cold-Rolled Flat

Anderson,Ind. G6	11.65
Baltimore T6	11.95
Boston T6	11.95
Buffalo W12	11.65
Chicago W13	11.75
Cleveland A7	11.65
Crawfordsville,Ind. M8	11.65
Dover,O. G6	11.65
Fostoria,O. S1	11.65
FranklinPark,Ill. T6	11.75
Kokomo,Ind. C16	11.65
Massillon,O. R8	11.65
Milwaukee C23	11.85
Monessen,Pa. P7, P16	11.65
Palmer,Mass. W12	11.95
Pawtucket,R.I. N8	11.95
Philadelphia P24	11.95
Riverdale,Ill. A1	11.75
Rome,N.Y. R6	11.65
Sharon,Pa. S3	11.65
Trenton,N.J. R5	11.95
Warren,O. B9	11.65
Worcester,Mass. A7, T6	11.95

NAILS, Stock

	Col.
AlabamaCity,Ala. R2	173
Aliquippa,Pa. J5	173
Atlanta A11	175
Bartonville,Ill. K4	175
Chicago W13	173
Cleveland A9	173
Crawfordsville,Ind. M8	175
Donora,Pa. A7	173
Duluth A7	173
Fairfield,Ala. T2	173
Houston S5	178
Jacksonville,Fla.(20) M8	184
Johnstown,Pa. B2	173
Joliet,Ill. A7	173
KansasCity,Mo. S5	178
Kokomo,Ind. C16	175
Minnequa,Colo. C10	178
Monessen,Pa. P7	173
Pittsburg,Calif. C11	192
Rankin,Pa. A7	173
S.Chicago,Ill. R2	173
SparrowsPt.,Md. B2	175
Sterling,Ill.(7) N15	175
Worcester,Mass. A7	179

(To Wholesalers; per cwt)

Galveston,Tex. D7 ... $9.10

NAILS, Cut (100 lb keg)
To Dealers (33)

Conshohocken,Pa. A3	$9.80
Wheeling,W.Va. W10	9.80

POLISHED STAPLES

	Col.
AlabamaCity,Ala. R2	175
Aliquippa,Pa. J5	175
Atlanta A11	177
Bartonville,Ill. K4	177
Crawfordsville,Ind. M8	177
Donora,Pa. A7	175
Duluth A7	175
Fairfield,Ala. T2	175
Jacksonville,Fla.(20) M8	186
Johnstown,Pa. B2	175
Joliet,Ill. A7	175
Kokomo,Ind. C6	177
Minnequa,Colo. C10	180
Pittsburg,Calif. C11	194
Rankin,Pa. A7	175
S.Chicago,Ill. R2	175
SparrowsPt.,Md. B2	177
Sterling,Ill.(7) N15	175
Worcester,Mass. A7	181

TIE WIRE, Automatic Baler (14½ Ga.)(Per 97 lb Net Box)
Coil No. 3150

AlabamaCity,Ala. R2	$10.26
Atlanta A11	10.36
Bartonville,Ill. K4	10.36
Buffalo W12	10.26
Chicago W13	10.26
Crawfordsville,Ind. M8	10.36
Donora,Pa. A7	10.26
Duluth A7	10.26
Fairfield,Ala. T2	10.26
Houston S5	10.51
Jacksonville,Fla. M8	10.82
Johnstown,Pa. B2	10.26
Joliet,Ill. A7	10.26
KansasCity,Mo. S5	10.51
Kokomo,Ind. C16	10.36
LosAngeles B3	11.05
Minnequa,Colo. C10	10.51
Pittsburg,Calif. C11	11.04
S.Chicago,Ill. R2	10.26
S.SanFrancisco C10	11.04
SparrowsPt.,Md. B2	10.36
Sterling,Ill.(37) N15	10.36

Coil No. 6500 Stand.

AlabamaCity,Ala. R2	$10.60
Atlanta A11	10.70
Bartonville,Ill. K4	10.70
Buffalo W12	10.60
Chicago W13	10.60
Crawfordsville,Ind. M8	10.70
Donora,Pa. A7	10.60
Duluth A7	10.60
Fairfield,Ala. T2	10.60
Houston S5	10.85
Jacksonville,Fla. M8	11.16
Johnstown,Pa. B2	10.60
Joliet,Ill. A7	10.60
KansasCity,Mo. S5	10.85
Kokomo,Ind. C16	10.70
LosAngeles B3	11.40
Minnequa,Colo. C10	10.85
Pittsburg,Calif. C11	11.40
S.Chicago,Ill. R2	10.60
S.SanFrancisco C10	11.40
SparrowsPt.,Md. B2	10.70
Sterling,Ill.(37) N15	10.70

Coil No. 6500 Interim

AlabamaCity,Ala. R2	$10.65
Atlanta A11	10.75
Bartonville,Ill. K4	10.75
Buffalo W12	10.65
Chicago W13	10.65
Crawfordsville,Ind. M8	10.75
Donora,Pa. A7	10.65
Duluth A7	10.65
Fairfield,Ala. T2	10.65
Houston S5	10.90
Jacksonville,Fla. M8	11.21
Johnstown,Pa. B2	10.65
Joliet,Ill. A7	10.65
KansasCity,Mo. S5	10.90
Kokomo,Ind. C16	10.75
LosAngeles B3	11.45
Minnequa,Colo. C10	10.90
Pittsburg,Calif. C11	11.45
S.Chicago,Ill. R2	10.65
S.SanFrancisco C10	11.45
SparrowsPt.,Md. B2	10.75
Sterling,Ill.(37) N15	10.75

BALE TIES, Single Loop

	Col.
AlabamaCity,Ala. R2	212
Atlanta A11	214
Bartonville,Ill. K4	214
Crawfordsville,Ind. M8	214
Donora,Pa. A7	212
Duluth A7	212
Fairfield,Ala. T2	212
Houston S5	217
Jacksonville,Fla. M8	219
Joliet,Ill. A7	212
KansasCity,Mo. S5	217
Kokomo,Ind. C16	214
Minnequa,Colo. C10	217
Pittsburg,Calif. C11	236
S.SanFrancisco C10	236
SparrowsPt.,Md. B2	214
Sterling,Ill.(7) N15	214

FENCE POSTS

Birmingham C15	171
ChicagoHts.,Ill. C2, I-2	172
Duluth A7	172
Franklin,Pa. F5	172
Huntington,W.Va. C15	171
Johnstown,Pa. B2	172
Marion,O. P11	172
Minnequa,Colo. C10	177
Sterling,Ill.(1) N15	172
Tonawanda,N.Y. B12	174

WIRE, Barbed

	Col.
AlabamaCity,Ala. R2	193**
Aliquippa,Pa. J5	190§
Atlanta A11	198*
Bartonville,Ill. K4	198
Crawfordsville,Ind. M8	198
Donora,Pa. A7	193†
Duluth A7	193†
Fairfield,Ala. T2	193†
Houston S5	198**
Jacksonville,Fla. M8	203
Johnstown,Pa. B2	196§
Joliet,Ill. A7	193†
KansasCity,Mo. S5	198**
Kokomo,Ind. C16	195†
Minnequa,Colo. C10	198**
Monessen,Pa. P7	196*
Pittsburg,Calif. C11	213†
Rankin,Pa. A7	193†
S.Chicago,Ill. R2	193**
S.SanFrancisco C10	213**
SparrowsPoint,Md. B2	198§
Sterling,Ill.(7) N15	198*†

WOVEN FENCE, 9-15 Ga.

	Col.
Ala.City,Ala. R2	187**
Aliq'ppa,Pa.9-14½ga.J5	190§
Atlanta A11	192*
Bartonville,Ill. K4	192
Crawfordsville,Ind. M8	192
Donora,Pa. A7	187†
Duluth A7	187†
Fairfield,Ala. T2	187†
Houston S5	192**
Jacksonville,Fla. M8	197
Johnstown,Pa.(43) B2	190§
Joliet,Ill. A7	187†
KansasCity,Mo. S5	192**
Kokomo,Ind. C16	189†
Minnequa,Colo. C10	192**
Pittsburg,Calif. C11	210†
Rankin,Pa. A7	187†
S.Chicago,Ill. R2	187**
Sterling,Ill.(7) N15	192*†

WIRE (16 gage)	An'ld Stone	Galv. Stone
Ala.City,Ala.R2	17.15	18.70**
Aliq'ppa,Pa. J5	17.15	18.95
Bartonville,Ill. K4	17.25	19.05
Cleveland A7	17.15	....
Crawf'dsville,Ind. M8	17.25	19.05
Fostoria,O. S1	17.65	19.20†
Houston S5	17.40	18.95**
Jacksonville,Fla. M8	17.50	19.30
Johnstown,Pa. B2	17.15	18.95§
Kan.City,Mo. S5	17.40	....
Kokomo,Ind. C16	17.25	18.80†
Minnequa,Colo. C10	17.40	18.95**
Palmer,Mass. W12	17.45	19.00†
Pittsburg,Calif. C11	17.50	19.05†
SparrowsPt.,Md. B2	17.25	19.05§
Sterling,Ill.(37) N15	17.25	19.05††
Waukegan A7	17.15	18.70†
Worcester,Mass. A7	17.45	....

WIRE, Merchant Quality

(6 to 8 gage)	An'ld	Galv.
Ala.City,Ala. R2	8.65	9.20**
Aliquippa,Pa. J5	8.65	9.325§
Atlanta(48) A11	8.75	9.425*
Bartonville(48) K4	8.75	9.425
Buffalo W12	8.65	9.20†
Cleveland A7	8.65	....
Crawfordsville M8	8.75	9.425
Donora,Pa. A7	8.65	9.20†
Duluth A7	8.65	9.20†
Fairfield T2	8.65	9.20†
Houston(48) S5	8.90	9.45**
Jacks'ville,Fla. M8	9.00	9.675
Johnstown B2(48)	8.65	9.325§
Joliet,Ill. A7	8.65	9.20†
Kans.City(48) S5	8.90	9.45**
Kokomo C16	8.75	9.30†
LosAngeles B3	9.60	10.275§
Minnequa C10	8.90	9.45**
Monessen P7(48)	8.65	9.25*
Palmer,Mass. W12	8.95	9.50†
Pitts.,Calif. C11	9.60	10.15†
Rankin,Pa. A7	8.65	9.20†
S.Chicago R2	8.65	9.20**
S.SanFran. C10	9.60	10.15**
Spar'wsPt.B2(48)	8.75	9.425§
Sterling(48) N15	8.90	9.575††
Sterling(1) (48)	8.80	9.475††
Struthers,O.(48) Y1	8.65	9.30‡
Worcester,Mass. A7	8.95	9.50†

Based on zinc price of: *13.50. †5c. §10c. ‡Less than 10c. ††10.50c. **Subject to zinc equalization extras.

FASTENERS

(Base discounts, full container quantity, per cent off list, f.o.b. mill)

BOLTS

Carriage, Machine Bolts
Full Size Body (cut thread)

½ in. and smaller:	
6 in. and shorter	49.0
Longer than 6 in.	39.0
⅝ in. thru 1 in.:	
6 in. and shorter	39.0
Longer than 6 in.	35.0
1⅛ in. and larger:	
All lengths	35.0

Undersized Body (rolled thread)

½ in. and smaller:	
6 in. and shorter	49.0

Carriage, Machine, Lag Bolts
Hot Galvanized:

½ in. and smaller:	
6 in. and shorter	29.0
Longer than 6 in.	15.0
⅝ in. and larger:	
All lengths	12.0

Lag Bolts (all diam.)

6 in. and shorter	49.0
Longer than 6 in.	39.0

Plow and Tap Bolts

½ in. and smaller by 6 in. and shorter	49.0
Larger than ½ in. or longer than 6 in.	39.0

Blank Bolts 39.0
Step, Elevator, Tire Bolts 49.0

Stove Bolts, Slotted:

1/4 to ¼ in. incl.:	
3 in. and shorter	55.0
⅝ to ½ in., inclusive	55.0

NUTS

Reg. & Heavy Square Nuts:
All sizes 55.5

Square Nuts, Reg. &
Heavy, Hot Galvanized:
All sizes 41.0

Hex Nuts, Reg. &
Heavy, Hot Pressed:

¾ in. and smaller	60.5
⅞ in. to 1 in., incl.	55.5
1⅛ in. to 1½ in., incl.	58.5
1⅝ in. and larger	53.5

Hex Nuts, Reg. &
Heavy, Cold Punched:

¾ in. and smaller	60.5
⅞ in. to 1½ in., incl.	55.5
1⅝ in. and larger	53.5

Hex Nuts, All Types,
Hot Galvanized:

¾ in. and smaller	46.5
⅞ in. to 1 in., incl.	41.5
1⅛ in. to 1½ in., incl.	46.5

Hex Nuts, Semifinished, Heavy (Incl. Slotted):

¾ in. and smaller	60.5
⅞ in. to 1½ in., incl.	55.5
1⅝ in. and larger	53.5

Hex Nuts, Finished (Incl. Slotted and Castellated):

1 in. and smaller	63.0
1⅛ in. to 1½ in., incl.	59.0
1⅝ in. and larger	53.5

Semifinished Hex Nuts, Reg. (Incl. Slotted):

⅝ in. and smaller	60.5
¾ in. to 1 in., incl.	63.0
1⅛ in. to 1½ in., incl.	59.0
1⅝ in. and larger	53.5

CAP AND SETSCREWS
(Base discounts, packages, per cent off list, f.o.b. mill)

Hex Head Capscrews, Coarse or Fine Thread, Bright:
6 in. and shorter:

⅝ in. and smaller	40.0
¾, ⅞, and 1 in. diam.	22.0
Longer than 6 in.:	
⅝ in. and smaller	8.0
¾, ⅞, and 1 in. diam.	+ 6.0

High Carbon, Heat Treated:
6 in. and shorter:

⅝ in. and smaller	26.0
¾, ⅞, and 1 in. diam.	3.0
Longer than 6 in.:	
⅝ in. and smaller	+ 13.0
¾, ⅞, and 1 in. diam.	+ 32.0

Flat Head Capscrews:
¾ in. and smaller + 76.0

Setscrews, Square Head, Cup Point, Coarse Thread:
Through 1 in. diam.:
6 in. and shorter Net
Longer than 6 in. + 23

RIVETS

F.o.b. Cleveland and/or freight equalized with Pittsburgh, f.o.b. Chicago and/or freight equalized with Birmingham except where equalization is too great.

Structural ½ in., larger 12.25
7/8 in. under: List less 19%

BOILER TUBES

Net base c.l. prices, dollars per 100 ft. mill; minimum wall thickness, cut lengths 10 to 24 ft, inclusive.

O.D. In.	B.W. Gage	Seamless H.R.	Seamless C.D.	Elec. Weld H.R.
1	13	....	25.98	23.54
1¼	13	....	30.78	23.36
1½	13	29.03	34.01	25.83
1¾	13	34.29	40.18	30.51
2	13	38.44	45.05	34.20
2¼	13	43.29	50.75	38.52
2¼	12	46.99	55.06	41.81
2½	12	51.76	60.65	46.05
2¾	12	56.04	65.67	49.88
3	12	59.76	70.03	53.19

RAILWAY MATERIALS

	Standard No. 1	Standard No. 2	Tee Rails All	Tee Rails 60 lb Under
Rails				
Bessemer,Pa. U5	5.525	5.425	....	6.50
Ensley,Ala. T2	5.525	5.425	....	6.50
Fairfield,Ala. T2	....	....	....	6.50
Eary,Ind. U5	5.525	5.425	....	....
Huntington,W.Va. C15	....	....	....	6.50
IndianaHarbor,Ind. I-2	5.525	5.425	5.475	....
Johnstown,Pa. B2	....	....	....(16)	6.50
Lackawanna,N.Y. B2	5.525	5.425	....	6.50
Minnequa,Colo. C10	5.525	5.425	....	7.00
Steelton,Pa. B2	5.525	5.425	....	....
Williamsport,Pa. S19	....	....	....	6.50

TIE PLATES

Fairfield,Ala. T2	6.60
Gary,Ind. U5	6.60
Ind.Harbor,Ind. I-2	6.60
Lackawanna,N.Y. B2	6.60
Minnequa,Colo. C10	6.60
Seattle B3	6.75
Steelton,Pa. B2	6.60
Torrance,Calif. C11	6.75

JOINT BARS

Bessemer,Pa. U5	6.975
Fairfield,Ala. T2	6.975
Ind.Harbor,Ind. I-2	6.975
Joliet,Ill. U5	6.975
Lackawanna,N.Y. B2	6.975
Minnequa,Colo. C10	6.975
Steelton,Pa. B2	6.975

AXLES

Ind.Harbor,Ind. S13	8.775
Johnstown,Pa. B2	8.775

TRACK BOLTS, Untreated

Cleveland R2	14.75
KansasCity,Mo. S5	14.75
Lebanon,Pa. B2	14.75
Minnequa,Colo. C10	14.75
Pittsburgh P14	14.75
Seattle B3	15.25

SCREW SPIKES
Lebanon,Pa. B2 14.50

STANDARD TRACK SPIKES

Fairfield,Ala. T2	9.75
Ind.Harbor,Ind. I-2, Y1	9.75
KansasCity,Mo. S5	9.75
Lebanon,Pa. B2	9.75
Minnequa,Colo. C10	9.75
Pittsburgh J5	9.75
Seattle B3	10.25
S.Chicago,Ill. R2	9.75
Struthers,O. Y1	9.75
Youngstown R2	9.75

Footnotes

(1) Chicago base.
(2) Angles, flats, bands.
(3) Merchant.
(4) Reinforcing.
(5) 1⅛ to under 1 7/16 in.; 1 7/16 to under 1 15/16 in., 6.70c; 1 15/16 to 8 in., inclusive, 7.05c.
(6) Chicago or Birm. base.
(7) Chicago base 2 cols. lower.
(8) 16 Ga. and heavier.
(9) Merchant quality; and 0.35c for special quality.
(10) Pittsburgh base.
(11) Cleveland & Pitts. base.
(12) Worcester, Mass. base.
(13) Add 0.25c for 17 Ga. & heavier.
(14) Gage 0.143 to 0.249 in.; for gage 0.142 and lighter, 5.80c.
(15) ¾" and thinner.
(16) 40 lb and under.
(17) Flats only; 0.25 in. & heavier.
(18) To dealers.
(19) Chicago & Pitts. base.
(20) Plus 1c per 100 lb.
(21) New Haven, Conn. base.
(22) Deld. San Francisco Bay area.
(23) Special quality.
(24) Deduct 0.15c, finer than 15 Ga.
(25) Bar mill bands.
(27) Bar mill sizes.
(28) Bonderized.
(29) Youngstown base.
(30) Sheared; for universal mill add 0.45c.
(31) Widths over ⅝ in.; 7.60c, for widths ⅝ in. and under by 0.125 in. and thinner.
(32) Buffalo base.
(33) To jobbers, deduct 20c.
(34) 9.60c for cut lengths.
(35) 72" and narrower.
(36) 54" and narrower.
(37) Chicago base, 10 points lower.
(38) 14 Ga. & lighter; 48" & narrower.
(39) 48" and narrower.
(40) Lighter than 0.035"; 0.035" and heavier, 0.25c higher.
(41) 9.10c for cut lengths.
(42) Mill lengths, f.o.b. mill; deld. in mill zone or within switching limits, 5.685c.
(43) 9-14½ Ga.
(44) To fabricators.
(45) 0.022 in. and lighter, over 0.022", 8.20c.
(48) 6-7 Ga.
(49) 3½ in. and smaller rounds: 9.50c, over 3½ in. and other shapes.

SEAMLESS STANDARD PIPE, Threaded and Coupled

Carload discounts from list, %

Size—Inches	2		2½		3		3½		4		5		6	
List Per Ft	37c		58.5c		76.5c		92c		$1.09		$1.48		$1.92	
Pounds Per Ft	3.68		5.82		7.62		9.20		10.89		14.81		19.18	
	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*
Aliquippa, Pa. J5	+9.25	+24.25	+2.75	+19.5	+0.25	+17	1.25	+15.5	1.25	+15.5	1	+15.75	3.5	+13.25
Ambridge, Pa. N2	+9.25	....	+2.75	....	+0.25	....	1.25	....	1.25	....	1	....	3.5	....
Lorain, O. N3	+9.25	+24.25	+2.75	+19.5	+0.25	+17	1.25	+15.5	1.25	+15.5	1	+15.75	3.5	+13.25
Youngstown Y1	+9.25	+24.25	+2.75	+19.5	+0.25	+17	1.25	+15.5	1.25	+15.5	1	+15.75	3.5	+13.25

ELECTRIC STANDARD PIPE, Threaded and Coupled

Carload discounts from list, %

Youngstown R2	+9.25	+24.25	+2.75	+19.5	+0.25	+17	1.25	+15.5	1.25	+15.5	1	+15.75	3.5	+13.25

BUTTWELD STANDARD PIPE, Threaded and Coupled

Carload discounts from list, %

Size—Inches	⅛		¼		⅜		½		¾		1		1¼	
List Per Ft	5.5c		6c		6c		8.5c		11.5c		17c		23c	
Pounds Per Ft	0.24		0.42		0.57		0.85		1.13		1.68		2.28	
	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*
Aliquippa, Pa. J5	....	....	....	....	....	....	5.25	+10	8.25	+6	11.75	+1.5	14.25	+0.75
Alton, Ill. L1	....	....	....	....	....	....	3.25	+12	6.25	+8	9.75	+3.5	12.25	+2.75
Benwood, W. Va. W10	4.5	+22	+7.5	+31	+18	+39.5	5.25	+10	8.25	+6	11.75	+1.5	14.25	+0.75
Butler, Pa. F6	5.5	+21	+6.5	+30	+17	+38.5	....	....	....	....	....	....	....	....
Etna, Pa. N2	....	....	....	....	....	....	5.25	+10	8.25	+6	11.75	+1.5	14.25	+0.75
Fairless, Pa. N3	....	....	....	....	....	....	3.25	+12	6.25	+8	9.75	+3.5	12.25	+2.75
Fontana, Calif. K1	....	....	....	....	....	....	+8.25	+23.5	+5.25	+19.5	+1.75	+15	0.75	+14.25
Indiana Harbor, Ind. Y1	....	....	....	....	....	....	4.25	+11	7.25	+7	10.75	+2.5	13.25	+3.25
Lorain, O. N3	....	....	....	....	....	....	5.25	+10	8.25	+6	11.75	+1.5	14.25	+0.75
Sharon, Pa. S4	5.5	+21	+6.5	+30	+17	+38.5	....	....	....	....	....	....	....	....
Sharon, Pa. M6	....	....	....	....	....	....	5.25	+10	8.25	+6	11.75	+1.5	14.25	+0.75
Sparrows Pt., Md. B2	3.5	+23	+8.5	+32	+19	+40.5	3.25	+12	6.25	+8	9.75	+3.5	12.25	+2.75
Wheatland, Pa. W9	5.5	+21	+6	+30	+17	+38.5	5.25	+10	8.25	+6	11.75	+1.5	14.25	+0.75
Youngstown R2, Y1	....	....	....	....	....	....	5.25	+10	8.25	+6	11.75	+1.5	14.25	+0.75

Size—Inches	1½		2		2½		3		3½		4	
List Per Ft	27.5c		37c		58.5c		76.5c		92c		$1.09	
Pounds Per Ft	2.73		3.68		5.82		7.62		9.20		10.89	
	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*
Aliquippa, Pa. J5	14.75	0.25	15.25	0.75	16.75	0.5	16.75	0.5	....	....	....	....
Alton, Ill. L1	12.75	+1.75	13.25	+1.25	14.75	+1.5	14.75	+1.5	....	....	....	....
Benwood, W. Va. W10	14.75	0.25	15.25	0.75	16.75	0.5	16.75	0.5	6.25	+10.5	6.25	+10.5
Etna, Pa. N2	14.75	0.25	15.25	0.75	16.75	0.5	16.75	0.5	6.25	+10.5	6.25	+10.5
Fairless, Pa. N3	12.75	+1.75	13.25	+1.25	14.75	+1.5	14.75	+1.5	4.25	+12.5	4.25	+12.5
Fontana, Calif. K1	1.25	+13.25	1.75	+12.75	3.25	+13	3.25	+13	+7.25	+24	+7.25	+24
Indiana Harbor, Ind. Y1	13.75	+0.75	14.25	+0.25	15.75	+0.5	15.25	+0.5	5.25	+11.5	5.25	+11.5
Lorain, O. N3	14.75	0.25	15.25	0.75	16.75	0.5	16.75	0.5	....	....	....	....
Sharon, Pa. M6	14.75	0.25	15.25	0.75	16.75	0.5	16.75	0.5	....	....	....	....
Sparrows Pt., Md. B2	12.75	+1.75	13.25	+1.25	14.75	+1.5	14.75	+1.5	4.25	+12.5	4.25	+12.5
Wheatland, Pa. W9	14.75	0.25	15.25	0.75	16.75	0.5	16.75	0.5	6.25	+10.5	6.25	+10.5
Youngstown R2, Y1	14.75	0.25	15.25	0.75	16.75	0.5	16.75	0.5	6.25	+10.5	6.25	+10.5

*Galvanized pipe discounts based on current price of zinc (10.00c, East St. Louis).

Stainless Steel

Representative prices, cents per pound; subject to current lists of extras

AISI	—Rerolling—		Forging	H.R.	H.R. Rods; C.F.	Bars; Structural			C.R. Strip; Flat
Type	Ingot	Slabs	Billets	Strip	Wire	Shapes	Plates	Sheets	Wire
201	22.00	27.00	....	36.00	....	42.00	44.25	48.50	45.00
202	23.75	30.25	36.50	39.00	40.75	43.00	45.00	49.25	49.25
301	23.25	28.00	37.25	37.25	42.00	44.25	46.25	51.25	47.50
302	25.25	31.50	38.00	40.50	42.75	45.00	47.25	52.00	52.00
302B	25.50	32.75	40.75	45.75	45.00	47.25	49.50	57.00	57.00
303	....	32.00	41.00	....	45.50	48.00	50.00	56.75	56.75
304	27.00	33.25	40.50	44.25	45.25	47.75	50.75	55.00	55.00
304L	....	....	48.25	51.50	53.00	55.50	58.50	63.25	63.25
305	28.50	36.75	42.50	47.50	45.25	47.75	51.25	58.75	58.75
308	30.75	38.25	47.25	50.25	52.75	55.75	60.25	63.00	63.00
309	39.75	49.50	57.75	64.50	63.75	67.00	71.00	80.50	80.50
310	49.75	61.50	78.00	84.25	86.50	91.00	92.75	96.75	96.75
314	....	....	....	....	86.50	....	92.75	....	104.50
316	39.75	49.50	62.25	69.25	69.25	73.00	76.75	80.75	80.75
316L	....	....	70.00	76.50	77.00	80.75	84.50	89.25	89.25
317	48.00	60.00	76.75	88.25	86.25	90.75	93.50	101.00	101.00
321	32.25	40.00	47.00	53.50	52.50	55.50	59.75	65.50	65.50
330	....	....	106.75	....	106.75	106.75	105.50	108.00	149.25
18-8 CbTa	37.00	46.50	55.75	63.50	61.50	64.75	69.75	79.25	79.25
403	....	....	32.00	....	35.75	37.75	40.25	48.25	48.25
405	19.50	25.50	29.75	36.00	33.50	35.25	37.50	46.75	46.75
410	16.75	21.50	28.25	31.00	32.00	33.75	35.00	40.25	40.25
416	....	....	28.75	....	32.50	34.25	36.25	48.25	48.25
420	....	33.50	34.25	41.75	39.25	41.25	45.25	62.00	62.00
430	17.00	21.75	28.75	32.00	32.50	34.25	36.00	40.75	40.75
430F	....	....	29.50	....	33.00	34.75	36.75	51.75	51.75
431	....	28.75	37.75	....	42.00	44.25	46.00	56.00	56.00
446	....	....	39.25	59.00	44.25	46.50	47.75	70.00	70.00

Stainless Steel Producers Are: Allegheny Ludlum Steel Corp.; American Steel & Wire Div., U. S. Steel Corp.; Anchor Drawn Steel Co., division of Vanadium-Alloys Steel Co.; Armco Steel Corp.; Babcock & Wilcox Co.; Bethlehem Steel Co.; J. Bishop & Co.; A. M. Byers Co.; G. O. Carlson Inc.; Carpenter Steel Co.; Charter Wire Products; Crucible Steel Co. of America; Damascus Tube Co.; Dearborn Div., Sharon Steel Corp.; Wilbur B. Driver Co.; Driver-Harris Co.; Eastern Stainless Steel Corp.; Firth Sterling Inc.; Fort Wayne Metals Inc.; Green River Steel Corp., subsidiary of Jessop Steel Co.; Indiana Steel & Wire Co.; Ingersoll Steel Div., Borg-Warner Corp.; Ellwood Ivins Steel Tube Works Inc.; Jessop Steel Co.; Johnson Steel & Wire Co. Inc.; Stainless Steel Div., Jones & Laughlin Steel Corp.; Joslyn Stainless Steels, division of Joslyn Mfg. & Supply Co.; Latrobe Steel Co.; Lukens Steel Co.; Maryland Fine & Specialty Wire Co. Inc.; McInnes Steel Co.; McLouth Steel Corp.; Metal Forming Corp.; Midvale-Heppenstall Co.; National Standard Co.; National Tube Div., U. S. Steel Corp.; Pacific Tube Co.; Page Steel & Wire Div., American Chain & Cable Co. Inc.; Pittsburgh Rolling Mills Inc.; Republic Steel Corp.; Riverside-Alloy Metal Div., H. K. Porter Company Inc.; Rodney Metals Inc.; Sawhill Tubular Products Inc.; Sharon Steel Corp.; Simonds Saw & Steel Co.; Specialty Wire Co. Inc.; Standard Tube Co.; Superior Steel Corp.; Superior Tube Co.; Swepco Tube Corp.; Techalloy Co. Inc.; Timken Roller Bearing Co.; Trent Tube Co., subsidiary of Crucible Steel Co. of America; Tube Methods Inc.; Ulbrich Stainless Steels Inc.; U. S. Steel Corp.; Universal-Cyclops Steel Corp.; Vanadium-Alloys Steel Co.; Wall Tube & Metal Products Co.; Wallingford Steel Co., subsidiary of Allegheny Ludlum Steel Corp.; Washington Steel Corp.

Clad Steel

	Plates—Carbon Base 5%	10%	15%	20%	Sheets—Carbon Base 20%
Stainless					
302	....	....	....	....	37.50
304	34.70	37.95	42.25	46.70	39.75
304L	36.90	40.55	45.10	49.85	....
316	40.35	44.50	49.50	54.50	58.25
316L	45.05	49.35	54.70	60.10	....
316 Cb	47.30	53.80	61.45	69.10	....
321	36.60	40.05	44.60	49.30	47.25
347	38.25	42.40	47.55	52.80	57.00
405	28.60	29.85	33.35	36.85	....
410	28.15	29.55	33.10	36.70	....
430	28.30	29.80	33.55	37.25	....
Inconel	48.90	59.55	70.15	80.85	....
Nickel	41.65	51.95	62.30	72.70	....
Nickel, Low Carbon	41.95	52.60	63.30	74.15	....
Monel	43.35	53.55	63.80	74.05	....
Copper*	....	....	....	....	46.00

	Strip, Carbon Base—Cold Rolled— 10%	Both Sides
Copper*	33.95	40.25

*Deoxidized. Production points: Stainless-clad sheets, New Castle, Ind. I-4; stainless-clad plates, Claymont, Del. C22, Coatesville, Pa. L7, New Castle, Ind. I-4, and Washington, Pa. J3; nickel, inconel, monel-clad plates, Coatesville L7; copper-clad strip, Carnegie, Pa. S18.

Tool Steel

Grade	$ per lb	Grade	$ per lb
Regular Carbon	0.305	Cr-Hot Work	0.475
Extra Carbon	0.360	W-Cr Hot Work	0.500
Special Carbon	0.475	V-Cr Hot Work	0.520
Oil Hardening	0.475	Hi-Carbon-Cr	0.925

Grade by Analysis (%) W	Cr	V	Co	Mo	$ per lb
20.25	4.25	1.6	12.25	....	4.285
18.25	4.25	1	4.75	....	2.500
18	4	2	9	....	2.870
18	4	2	....	....	1.960
18	4	1	....	....	1.795
9	3.5	..	....	....	1.395
13.5	4	3	....	....	2.060
13.75	3.75	2	5	....	2.440
6.4	4.5	1.9	....	5	1.300
6	4	3	....	6	1.545
1.5	4	1	....	8.5	1.155

Tool steel producers include: A4, A8, B2, B8, C4, C9, C13, C18, F2, J3, L3, M14, S8, U4, V2, and V3.

Pig Iron

F.o.b. furnace prices in dollars per gross ton, as reported to STEEL. Minimum delivered prices are approximate and do not include 3% federal transportation tax.

	Basic	No. 2 Foundry	Malle-able	Besse-mer
Birmingham District				
Birmingham R2	62.00	62.50‡	....	....
Birmingham U6	....	62.50‡	66.50	....
Woodward, Ala. W15	62.00**	62.50‡	66.50	....
Cincinnati, deld.	....	70.20	....	....
Buffalo District				
Buffalo H1, R2	66.00	66.50	67.00	67.50
N.Tonawanda, N.Y. T9	....	66.50	67.00	67.50
Tonawanda, N.Y. W12	66.00	66.50	67.00	67.50
Boston, deld.	77.29	77.79	78.29	....
Rochester, N.Y., deld.	69.02	69.52	70.02	....
Syracuse, N.Y., deld.	70.12	70.62	71.12	....
Chicago District				
Chicago I-3	66.00	66.50	66.50	67.00
S.Chicago, Ill. R2	66.00	....	66.50	67.00
S.Chicago, Ill. W14	66.00	....	66.50	67.00
Milwaukee, deld.	68.62	69.12	69.12	69.62
Muskegon, Mich., deld.	....	74.12	74.12	....
Cleveland District				
Cleveland R2, A7	66.00	66.50	66.50	67.00
Akron, Ohio, deld.	69.12	69.62	69.62	70.12
Mid-Atlantic District				
Birdsboro, Pa. B10	68.00	68.50	69.00	69.50
Chester, Pa. P4	*68.00*	*68.50*	*69.00*	
Swedeland, Pa. A3	68.00	68.50	69.00	69.50
New York, deld.		*75.50*	*76.00*	
Newark, N.J., deld.	*72.69*	*73.19*	*73.69*	*74.19*
Philadelphia, deld.	*70.41*	*70.91*	*71.41*	*71.90*
Troy, N.Y. R2	68.00	68.50	69.00	69.50
Pittsburgh District				
Neville Island, Pa. P6	66.00	66.50	66.50	67.00
Pittsburgh (N&S sides), Aliquippa, deld.	....	67.95	67.95	68.48
McKees Rocks, Pa., deld.	....	67.60	67.60	68.13
Lawrenceville, Homestead, Wilmerding, Monaca, Pa., deld.	....	68.26	68.26	68.79
Verona, Trafford, Pa., deld.	68.29	68.82	68.82	69.35
Brackenridge, Pa., deld.	68.60	69.10	69.10	69.63
Midland, Pa. C18	66.00	....	....	....
Youngstown District				
Hubbard, Ohio Y1	....	....	66.50	....
Sharpsville, Pa. S6	66.00	....	66.50	67.00
Youngstown Y1	....	....	66.50	67.00
Mansfield, Ohio, deld.	70.90	....	71.40	71.90
Duluth I-3	66.00	66.50	66.50	67.00
Erie, Pa. I-3	66.00	66.50	66.50	67.00
Everett, Mass. E1	67.50	68.00	68.50	....
Fontana, Calif. K1	75.00	75.50	....	....
Geneva, Utah C11	66.00	66.50	....	....
Granite City, Ill. G4	67.90	68.40	68.90	....
Ironton, Utah, C11	66.00	66.50	....	....
Minnequa, Colo. C10	68.00	68.50	69.00	....
Rockwood, Tenn. T3	....	62.50‡	66.50	....
Toledo, Ohio I-3	66.00	66.50	66.50	67.00
Cincinnati, deld.	72.54	73.04	....	....

**Phos. 0.70-0.90%; Phos. 0.30-0.69%, $63.
‡Phos. 0.70-0.90%; Phos. 0.30-0.69%, $63.50.

PIG IRON DIFFERENTIALS

Silicon: Add 75 cents per ton for each 0.25% Si or percentage thereof over base grade, 1.75-2.25%, except on low phos. iron on which base is 1.75-2.00%.

Manganese: Add 50 cents per ton for each 0.25% manganese over 1% or portion thereof.

Nickel: Under 0.50% no extra; 0.50-0.74%, inclusive, add $2 per ton and each additional 0.25%, add $1 per ton.

BLAST FURNACE SILVERY PIG IRON, Gross Ton

(Base 6.00-6.50% silicon; add $1 for each 0.50% silicon or portion thereof over the base grade within a range of 6.50 to 11.50%; starting with silicon over 11.50% add $1.50 per ton for each 0.50% silicon or portion thereof up to 14%; add $1 for each 0.50% Mn over 1%)

Jackson, Ohio, I-3, J1	78.00
Buffalo H1	79.25

ELECTRIC FURNACE SILVERY IRON, Gross Ton

(Base 14.01-14.50% silicon; add $1 for each 0.5% Si to 18%; $1.25 for each 0.50% Mn over 1%; $2 per gross ton premium for 0.045% max P)

Calvert City, Ky. P15	$99.00
Niagara Falls, N.Y. P15	99.00
Keokuk, Iowa Open-hearth & Fdry, $9 freight allowed K2	103.50
Keokuk, Iowa O.H. & Fdry, 12½ lb piglets, 16% Si, max fr'gt allowed up to $9, K2	106.50

LOW PHOSPHORUS PIG IRON, Gross Ton

Lyles, Tenn. T3 (Phos. 0.035% max)	$78.50
Troy, N.Y. R2 (Phos. 0.035% max)	74.00
Philadelphia, deld.	*82.67*
Cleveland A7 (Intermediate) (Phos. 0.036-0.075% max)	71.00
Duluth I-3 (Intermediate) (Phos. 0.036-0.075% max)	71.00
Erie, Pa. I-3 (Intermediate) (Phos. 0.036-0.075% max)	71.00
Neville Island, Pa. P6 (Intermediate) (Phos. 0.036-0.075% max)	71.00

Warehouse Steel Products

Representative prices, per pound, subject to extras, f.o.b. warehouse. City delivery charges are 15 cents per 100 lb except: Moline, Norfolk, Richmond, Washington, 20 cents; Baltimore, Boston, Los Angeles, New York, Philadelphia, Portland, Spokane, San Francisco, 10 cents; Atlanta, Chattanooga, Houston, Seattle, no charge.

	SHEETS				STRIP	BARS			Standard Structural Shapes	PLATES	
	Hot-Rolled	Cold-Rolled	Gal. 10 Ga.†	Stainless Type 302	Hot-Rolled*	H.R. Rounds	C.F. Rds.‡	H.R. Alloy 4140††§		Carbon	Floor
Atlanta	8.59§	9.86§	....	....	8.64	9.01	10.68	....	9.05	8.97	10.90
Baltimore	8.28	8.88	9.61	....	8.76	9.06	11.34#	15.18	9.19	8.66	10.14
Birmingham	8.18	9.45	11.07	....	8.23	8.60	10.57	....	8.64	8.56	10.70
Boston	9.38	10.44	11.45	53.50	9.42	9.73	12.90#	15.28	9.63	9.72	11.20
Buffalo	8.40	9.00	10.07	55.98	8.50	8.80	10.90#	15.00	8.90	8.90	10.45
Chattanooga	8.35	9.69	9.65	....	8.40	8.77	10.46	....	8.88	8.80	10.66
Chicago	8.20	9.45	10.00	53.00	8.23	8.60	8.80	14.65	8.64	8.56	9.88
Cincinnati	8.34	9.48	10.05	52.43	8.54	8.92	9.31	14.96	9.18	8.93	10.21
Cleveland	8.18	9.45	9.95	52.33	8.33	8.69	10.80#	14.74	9.01	8.79	10.11
Dallas	8.85	10.15	....	....	9.00	8.95	11.01	....	9.00	9.45	10.70
Denver	9.38	11.75	....	....	9.41	9.78	11.10	....	9.82	9.74	11.06
Detroit	8.43	9.70	10.35	56.50	8.58	8.90	9.15	14.91	9.18	8.91	10.13
Erie, Pa.	8.20	9.45	9.95¹⁰	....	8.50	8.75	9.05¹⁰	....	9.00	8.85	10.10
Houston	7.45	8.75	8.45	....	7.60	7.55	11.10	....	7.60	8.05	10.30
Jackson, Miss.	8.52	9.79	....	....	8.57	8.94	10.68	....	8.97	8.90	10.74
Los Angeles	7.85	10.75	11.65	57.60	7.80	7.95	12.00	....	7.85	7.80	9.95
Memphis, Tenn.	8.55	9.80	....	....	8.60	8.97	11.96#	....	9.01	8.93	10.56
Milwaukee	8.33	9.58	10.13	....	8.36	8.73	9.03	14.78	8.85	8.69	10.01
Moline, Ill.	8.55	9.80	10.35	....	8.58	8.95	9.15	....	8.99	8.91	....
New York	8.87	10.13	10.56	53.08	9.31	9.57	12.76#	15.09	9.35	9.43	10.71
Norfolk, Va.	8.05	....	....	....	8.55	8.60	10.80	....	8.95	8.45	9.95
Philadelphia	8.00	8.90	9.87	52.69	8.69	8.65	11.51#	15.01	8.50	8.77	9.77**
Pittsburgh	8.18	9.45	10.35	52.00	8.33	8.60	10.80#	14.65	8.64	8.56	9.88
Portland, Oreg.	8.50	11.20	11.55	57.38	9.55	8.65	14.50	15.95	8.65	8.30	11.50
Richmond, Va.	8.45	....	10.40	....	9.15	9.15	....	....	9.40	8.85	10.35
St. Louis	8.54	9.79	10.36	....	8.59	8.97	9.41	15.01	9.10	8.93	10.25
St. Paul	8.79	10.04	10.61	....	8.84	9.21	9.66	....	9.38	9.30	10.49
San Francisco	9.35	10.75	11.00	55.10	9.45	9.70	13.00	16.10	9.50	9.60	12.00
Seattle	9.95	11.15	12.00	57.38	10.00	10.10	14.05	16.35	9.80	9.70	12.10
South'ton, Conn.	9.07	10.33	10.71	....	9.48	9.74	....	....	9.57	9.57	10.91
Spokane	9.95	11.15	12.00	57.38	10.00	10.10	14.05	17.20	9.80	9.70	12.10
Washington	8.88	....	....	....	9.36	9.56	10.94	....	9.79	9.26	10.74

*Prices do not include gage extras; †prices include gage and coating extras; ‡includes 35-cent bar quality extras; §42 in. and under; **⅛ in. and heavier; ††as annealed; ‡‡over 4 in.; §§over 3 in.; #1 in. round C-1018.

Base quantities, 2000 to 4999 lb except as noted; cold-rolled strip and cold-finished bars, 2000 lb and over except in Seattle, 2000 to 9999 lb, and in Los Angeles, 6000 lb and over; stainless sheets, 8000 lb except in Chicago, New York, Boston, Seattle, Portland, Oreg. 10,000 lb and in San Francisco, 2000 to 4999 lb; hot-rolled products on West Coast, 2000 to 9999 lb, except in Portland, Oreg., 1000 to 9999 lb; ³—400 to 9999 lb; ⁵—1000 to 1999 lb; ⁸—2000 to 3999 lb; ¹⁰—2000 lb and over.

Refractories

Fire Clay Brick (per 1000)

High-Heat Duty: Ashland, Grahn, Hayward, Hitchins, Haldeman, Olive Hill, Ky., Athens, Troup, Tex., Beech Creek, Clearfield, Curwensville, Lock Haven, Lumber, Orviston, West Decatur, Winburne, Snow Shoe, Pa., Bessemer, Ala., Farber, Mexico, St. Louis, Vandalia, Mo., Ironton, Oak Hill, Parral, Portsmouth, Ohio, Ottawa, Ill., Stevens Pottery, Ga., $135; Salina, Pa., $140; Niles, Ohio, $138; Cutler, Utah, $165.

Super-Duty: Ironton, Ohio, Vandalia, Mo., Olive Hill, Ky., Clearfield, Salina, Pa., New Savage, Md., St. Louis, $175; Stevens Pottery, Ga., $185; Cutler, Utah, $233.

Silica Brick (per 1000)

Standard: Alexandria, Claysburg, Mt. Union, Sproul, Pa., Ensley, Ala., Pt. Matilda, Pa., Portsmouth, Ohio, Hawstone, Pa., $150; Warren, Niles, Windham, Ohio, Hays, Latrobe, Morrisville, Pa., $155; E. Chicago, Ind., Joliet, Rockdale, Ill., $160; Lehigh, Utah, $175; Los Angeles, $180.

Super-Duty: Sproul, Hawstone, Pa., Niles, Warren, Windham, Ohio, Leslie, Md., Athens, Tex., $157; Morrisville, Hays, Latrobe, Pa., $160; E. Chicago, Ind., $167; Curtner, Calif., $182.

Semisilica Brick (per 1000)

Clearfield, Pa., $140; Philadelphia, $137; Woodbridge, N. J., $135.

Ladle Brick (per 1000)

Dry Pressed: Alsey, Ill., Chester, New Cumberland, W. Va., Freeport, Johnstown, Merrill Station, Vanport, Pa., Mexico, Vandalia, Mo., Wellsville, Irondale, New Salisbury, Ohio, $96.75; Clearfield, Pa., Portsmouth, Ohio, $102.

High-Alumina Brick (per 1000)

50 *Per Cent:* St. Louis, Mexico, Vandalia, Mo., $235; Danville, Ill., $238; Philadelphia, Clearfield, Pa., $230; Orviston, Snow Shoe, Pa. $245.

60 *Per Cent:* St. Louis, Mexico, Vandalia, Mo., $295; Danville, Ill., $298; Philadelphia, Clearfield, Orviston, Snow Shoe, Pa., $305.

70 *Per Cent:* St. Louis, Mexico, Vandalia, Mo., $335; Danville, Ill., $338; Philadelphia, Clearfield, Orviston, Snow Shoe, Pa., $345.

Sleeves (per 1000)

Reesdale, Johnstown, Bridgeburg, Pa., St. Louis, $188.

Nozzles (per 1000)

Reesdale, Johnstown, Bridgeburg, Pa., St. Louis, $310.

Runners (per 1000)

Reesdale, Johnstown, Bridgeburg, Pa., $234.

Dolomite (per net ton)

Domestic, dead-burned, bulk, Billmeyer, Blue Bell, Williams, Plymouth Meeting, York, Pa., Millville, W. Va., Bettsville, Millersville, Martin, Woodville, Gibsonburg, Narlo, Ohio, $16.75; Thornton, McCook, Ill., $17; Dolly Siding, Bonne Terre, Mo., $15.

Magnesite (per net ton)

Domestic, dead-burned, bulk ⅛ in. grains with fines: Chewelah, Wash., Luning, Nev., $46; ⅜ in. grains with fines: Baltimore, $73.

Fluorspar

Metallurgical grades, f.o.b. shipping point in Ill., Ky., net tons, carloads, effective CaF_2 content 72.5%, $37-41; 70%, $36.40; 60%, $33-36.50. Imported, net tons, f.o.b. cars point of entry, duty paid, metallurgical grade: European, $33-34; Mexican, all rail, duty paid, $25.25-25.75; barge, Brownsville, Tex., $27.25-27.75.

Metal Powder

(Per pound f.o.b. shipping point in ton lots for minus 100 mesh, except as noted)

	Cents
Sponge Iron, Swedish: Deld. east of Mississippi River, ocean bags 23,000 lb and over.. F.o.b. Riverton or Camden, N. J., west of Mississippi River	10.50 9.50
Sponge Iron, Domestic, 98 + % Fe: Deld. east of Mississippi River, 23,000 lb and over	10.50
Electrolytic Iron: Melting stock, 99.9% Fe, irregular fragments of ⅛ in. x 1.3 in.	28.00
Annealed, 99.5% Fe	36.50
Unannealed (99 + % Fe)	36.00
Unannealed (99 + % Fe) (minus 325 mesh)	59.00
Powder Flakes (minus 16, plus 100 mesh)	29.00
Carbonyl Iron: 98.1-99.9%, 3 to 20 microns, depending on grade, 93.00-290.00 in standard 200-lb containers; all minus 200 mesh.	

Aluminum: Atomized, 500 lb drum, freight allowed: Carlots	39.50
Ton lots	41.50
Antimony, 500 lb lots	42.00*
Brass, 5000-lb lots	*30.30-45.70†*
Bronze, 5000-lb lots	*45.70-49.80†*
Copper: Electrolytic	*14.75**
Reduced	*14.75**
Lead	7.50*
Manganese: Minus 35 mesh	64.00
Minus 100 mesh	70.00
Minus 200 mesh	75.00
Nickel, unannealed	*$1.15*
Nickel-Silver, 5000-lb lots	*47.80-52.60†*
Phosphor-Copper, 5000-lb lots	*57.80*
Copper (atomized) 5000-lb lots	*38.30-46.80‡*
Silicon	47.50
Solder	7.00*
Stainless Steel, 304	*$1.07*
Stainless Steel, 316	*$1.26*
Tin	14.50*
Zinc, 5000-lb lots	17.50-30.70‡
Tungsten:	Dollars
Melting grade, 99%	
60 to 200 mesh:	
1000 lb and over	3.15
Less than 1000 lb	3.30
Chromium, electrolytic 99.8% Cr min metallic basis	5.00

*Plus cost of metal. †Depending on composition. ‡Depending on mesh.

Electrodes

Threaded with nipple; unboxed, f.o.b. plant

GRAPHITE

Inches Diam	Length	Per 100 lb
2	24	$60.75
2½	30	39.25
3	40	37.00
4	40	35.00
5⅛	40	34.75
6	60	31.50
7	60	28.25
8, 9, 10	60	28.00
12	72	26.75
14	60	26.75
16	72	25.75
17	60	26.25
18	72	26.25
20	72	25.25
24	84	26.00

CARBON

9	60	13.30
10	60	13.00
12	60	12.95
14	60	12.85
14	72	11.95
17	60	11.85
17	72	11.40
20	84	11.40
20	90	11.00
24	72, 84	11.25
24	96	10.95
30	84	11.05
40, 35	110	10.70
40	100	10.70

Imported Steel

(Base per 100 lb, landed, duty paid, based on current ocean rates. Any increase in these rates is for buyer's account. Source of shipment: Western continental European countries)

	North Atlantic	South Atlantic	Gulf Coast	West Coast
Deformed Bars, Intermediate, ASTM-A 305	*$5.58*	*$5.42*	*$5.42*	*$5.78*
Bar Size Angles	*5.77*	*5.65*	*5.65*	*5.95*
Structural Angles	*5.77*	*5.65*	*5.65*	*5.95*
I-Beams	*5.72*	*5.60*	*5.60*	*6.02*
Channels	*5.72*	*5.60*	*5.60*	*6.02*
Plates (basic bessemer)	7.64	7.58	7.64	7.88
Sheets, H.R.	8.25	8.20	8.20	8.50
Sheets, C.R. (drawing quality)	9.00	8.95	8.95	9.25
Furring Channels, C.R., 1000 ft, ¾ x 0.30 lb per ft	*26.20*	*26.20*	*26.20*	*27.05*
Barbed Wire (†)	6.95	6.95	6.95	7.40
Merchant Bars	6.37	6.32	6.37	6.61
Hot-Rolled Bands	7.20	7.15	7.15	7.55
Wire Rods, Thomas Commercial No. 5	6.73	6.73	6.73	7.13
Wire Rods, O.H. Cold Heading Quality No. 5	7.07	7.07	7.07	7.47
Bright Common Wire Nails ($)	8.12	8.12	8.12	8.32

†Per 82 lb. net, reel. §Per 100-lb kegs, 20d nails and heavier.

Ores

Lake Superior Iron Ore

(Prices effective for the 1957 shipping season, gross ton, 51.50% iron natural, rail of vessel, lower lake ports.)

Mesabi bessemer	$11.60
Mesabi nonbessemer	11.45
Old Range bessemer	11.85
Old Range nonbessemer	11.70
Open-hearth lump	12.70
High phos.	11.45

The foregoing prices are based on upper lake rail freight rates, lake vessel freight rates, handling and unloading charges, and taxes thereon, which were in effect Jan. 30, 1957, and increases or decreases after that date are absorbed by the seller.

Eastern Local Iron Ore

Cents per unit, deld. E. Pa.

New Jersey, foundry and basic concentrates	25.00-27.00

Foreign Iron Ore

Cents per unit, c.i.f. Atlantic ports

Swedish basic, 65%	*25.00*
N. African hematite (spot)	nom.
Brazilian iron ore 68-69%	*27.00*

Tungsten Ore

Net ton, unit

Foreign wolframite, good commercial quality	*$12.00-12.50**
Domestic, concentrates f.o.b. milling points	*20.00*

*Before duty.

Manganese Ore

Mn 46-48%, Indian (export tax included), $135 per long ton unit, c.i.f. U. S. ports, duty for buyer's account; other than Indian, nominal; contracts by negotiation.

Chrome Ore

Gross ton, f.o.b. cars New York, Philadelphia, Baltimore, Charleston, S. C., plus ocean freight differential for delivery to Portland, Oreg., Tacoma, Wash.

Indian and Rhodesian	
48% 3:1	*$50.00*
48% 2.8:1	*48.00*
48% no ratio	*39.00*
South African Transvaal	
48% no ratio	*$37.00*
44% no ratio	*27.00*
Turkish	
48% 3:1	*$55.00*
Domestic	
Rail nearest seller	
18% 3:1	$39.00

Molybdenum

Sulfide concentrate, per lb. of Mo content, mines, unpacked	$1.18

Antimony Ore

Per short ton unit of Sb content, c.i.f. seaboard

55-60%	$2.50-2.60
60-65%	2.60-2.90

Vanadium Ore

Cents per lb V_2O_5

Domestic	31.00

Metallurgical Coke

Price per net ton

Beehive Ovens

Connellsville, Pa., furnace	$14.75-15.75
Connellsville, Pa., foundry	18.00-18.50

Oven Foundry Coke

Birmingham, ovens	$28.85
Cincinnati, deld.	31.84
Buffalo, ovens	30.50
Camden, N. J., ovens	29.50
Detroit, ovens	30.50
Pontiac, Mich., deld.	32.25
Saginaw, Mich., deld.	33.83
Erie, Pa., ovens	30.50
Everett, Mass., ovens: New England, deld.	31.55*
Indianapolis, ovens	29.75
Ironton, Ohio, ovens	29.00
Cincinnati, deld.	31.84
Kearny, N. J., ovens	29.75
Milwaukee, ovens	30.50
Neville Island (Pittsburgh), Pa., ovens	29.25
Painesville, Ohio, ovens	30.50
Cleveland, deld.	32.69
Philadelphia, ovens	29.50
St. Louis, ovens	31.50
St. Paul, ovens	29.75
Chicago, deld.	*33.20*
Swedeland, Pa., ovens	29.50
Terre Haute, Ind., ovens	29.75

*Or within $4.85 freight zone from works.

Coal Chemicals

Spot, cents per gallon, ovens

Pure benzene	36.00
Toluene, one deg.	29.50
Industrial xylene	32.00-34.00

Per ton, bulk, ovens

Ammonium sulfate	$32.00-34.00

Cents per pound, producing point

Phenol: Grade 1, 17.50; Grade 2-3, 15.50; Grade 4, 17.50; Grade 5, 16.50; Grade 6, 14.50.	

Ferroalloys

MANGANESE ALLOYS

Spiegeleisen: Carlot, per gross ton, Palmerton, Neville Island, Pa., 21-23% Mn, $105; 19-21% Mn, 1-3% Si, $102.50; 16-19% Mn, $100.50.

Standard Ferromanganese: (Mn 74-76%, C 7% approx). Base price per net ton: $245, Johnstown, Duquesne, Sheridan, Neville Island, Pa.; Alloy, W. Va.; Ashtabula, Marietta, O.; Sheffield, Ala.; Portland, Oreg. Add or subtract $2 for each 1% or fraction thereof of contained manganese over 76% or under 74%, respectively. (Mn 79-81%). Lump $253 per net ton, f.o.b. Anaconda or Great Falls, Mont. Add $2.60 for each 1% above 81%; subtract $2.60 for each 1% below 79%, fractions in proportion to nearest 0.1%.

High-Grade Low-Carbon Ferromanganese: (Mn 85-90%). Carload, lump, bulk, max 0.07% C, 35.1c per lb of contained Mn, carload packed 36.4c, ton lots 37.9c, less ton 39.1c. Delivered. Deduct 1.5c for max 0.15% C grade from above prices, 3c for max 0.03% C, 3.5c for max 0.50% C, and 6.5c for max 75% C—max 7% Si. **Special Grade:** (Mn 90% min, C 0.07% max, P 0.06% max). Add 2.05c to the above prices. Spot, add 0.25c.

Medium-Carbon Ferromanganese: (Mn 80-85%, C 1.25-1.5%, Si 1.5% max). Carload, lump, bulk, 25.5c per lb of contained Mn, packed, carload 26.8c, ton lot 28.4c, less ton 29.6c. Delivered. Spot, add 0.25c.

Manganese Metal: 2" x D (Mn 95.5% min, Fe 2% max, Si 1% max, C 0.2%). Carload, lump, bulk, 45c per lb of metal; packed, 45.75c; ton lot 47.25c; less ton lot 49.25c. Delivered. Spot, add 2c.

Electrolytic Manganese Metal: Min carload, 34c; 2000 lb to min carload, 36c; 500 lb to 1999 lb, 38c; 50 lb cans, add 0.5c per lb. Preminum for hydrogen-removed metal, 0.75c per lb. Prices are f.o.b. cars, Knoxville, Tenn., freight allowed to St. Louis or any point east of Mississippi; or f.o.b. Marietta, O., freight allowed.

Silicomanganese: (Mn 65-68%). Contract, lump, bulk 1.50% C grade, 18-20% Si, 12.8c per lb of alloy. Packed, c.l. 14c, ton 14.45c, less ton 15.45c, f.o.b. Alloy, W. Va.; Ashtabula, Marietta, O.; Sheffield, Ala.; Portland, Oreg. For 2% C grade, Si 15-17%, deduct 0.2% from above prices. For 3% C grade Si 12-14.5%, deduct 0.4c from above prices. Spot, add 0.25c.

TITANIUM ALLOYS

Ferrotitanium, Low-Carbon: (Ti 20-25%, Al 3.5% max, Si 4% max, C 0.10% max). Contract, ton lot, 2" x D, $1.50 per lb of contained Ti; less ton $1.55. (Ti 38.43%, Al 8% max, Si 4% max, C 0.10% max). Ton lot $1.35, less ton $1.37, f.o.b. Niagara Falls, N. Y., freight allowed to St. Louis. Spot, add 5c.

Ferrotitanium, High-Carbon: (Ti 15-18%, C 6-8%). Contract $200 per ton ton, f.o.b. Niagara Falls, N. Y., freight allowed to destinations east of Mississippi River and north of Baltimore and St. Louis.

Ferrotitanium, Medium-Carbon: (Ti 17-21%, C 2-4.5%). Contract $225 per ton, f.o.b. Niagara Falls, N. Y., freight not exceeding St. Louis rate allowed.

CHROMIUM ALLOYS

High-Carbon Ferrochrome: Contract, c.l. lump, bulk 28.75c per lb of contained Cr; c.l. packed 30.30c, ton lot 32.05c; less ton 33.45c. Delivered. Spot, add 0.25c.

Low-Carbon Ferrochrome: Cr 63-66% (Simplex), carload, lump, bulk, C 0.025% max, 36.75c per lb contained Cr; 0.010% max, 37.75c. Ton lot, add 3.5c; less ton, add 5.2c. Delivered.
Cr 67.71%, carload, lump, bulk, C 0.02% max, 41.00c per lb contained Cr; 0.025% max, 39.75c; 0.05% max, 39.00c; 0.10% max, 38.50c; 0.20% max, 38.25c; 0.50% max, 38.00c; 1.0% max, 37.75c; 1.5% max, 37.50c; 2.0% max, 37.25c. Ton lot, add 3.4c; less ton lot, add 5.1c. Delivered.

Foundry Ferrochrome, High-Carbon: (Cr 62-66%, C 5-7%, Si 7-10%). Contract, c.l., 2 in. x D, bulk 30.05c per lb of contained Cr. Packed, c.l. 31.65c, ton 33.45c, less ton 34.95c. Delivered. Spot, add 0.25c.

Foundry Ferrosilicon Chrome: (Cr 50-54%, Si 28-32%, C 1.25% max). Contract, carload, packed, 8M x D, 21.25c, per lb of alloy, ton lot 22.50c; less ton lot 23.70c. Delivered. Spot, add 0.25c.

Ferrochrome-Silicon: Cr 39-41%, Si 42-45%, C 0.05% max or Cr 33-36%, Si 45-48%, C 0.05% max. Carload, lump, bulk, 3" x down and 2" x down, 27.50c per lb contained Cr, 14.20c per lb contained Si. 0.75" x down, 28.65c per lb contained Cr, 14.20c per lb contained Si. Delivered.

Chromium Metal Electrolytic: Commercial grade (Cr 99.8% min, metallic basis, Fe 0.2% max). Contract, carlot, packed 2" x D plate (about ⅛" thick) $1.29 per lb, ton lot $1.31, less ton lot $1.33. Delivered. Spot, add 5c.

VANADIUM ALLOYS

Ferrovanadium: Open-hearth grade (V 50-55%, Si 8% max, C 3% max). Contract, any quantity, $3.20 per lb of contained V. Delivered. Spot, add 10c. **Special Grade:** (V 50-55% or 70-75%, Si 2% max, C 0.5% max) $3.30. **High Speed Grade:** (V 50-55%, or 70-75%, Si 1.50% max, C 0.20% max) $3.40.

Grainal: Vanadium Grainal No. 1 $1.50 per lb; No. 6, 68c; No. 79, 50c, freight allowed.

Vanadium Oxide: Contract less carload lot, packed, $1.38 per lb contained V_2O_5, freight allowed. Spot, add 5c.

SILICON ALLOYS

25-30% Ferrosilicon: Contract, carload, lump, bulk, 20.0c per lb of contained Si. Packed 21.40c; ton lot 22.50c, f.o.b. Niagara Falls, N. Y., freight not exceeding St. Louis rate allowed.

50% Ferrosilicon: Contract, carload, lump, bulk, 14.20c per lb of contained Si. Packed c.l. 16.70c, ton lot 18.15c, less ton 19.80c, f.o.b. Alloy, W. Va.; Ashtabula, Marietta, O.; Sheffield, Ala.; Portland, Oreg. Spot, add 0.45c.

Low-Aluminum 50% Ferrosilicon: (Al 0.40% max). Add 1.45c to 50% ferrosilicon prices.

65% Ferrosilicon: Contract, carload, lump, bulk, 15.25c per lb contained silicon. Packed, c.l. 17.25c, ton lot 19.05c; less ton 20.4c. Delivered. Spot, add 0.35c.

75% Ferrosilicon: Contract, carload, lump, bulk, 16.4c per lb of contained Si. Packed, c.l. 18.30c, ton lot 19.95c, less ton 21.2c. Delivered. Spot, add 0.3c.

90% Ferrosilicon: Contract, carload, lump, bulk, 19.5c per lb of contained Si. Packed, c.l. 21.15c, ton lot 22.55c, less ton 23.6c. Delivered. Spot, add 0.25c.

Silicon Metal: (98% min Si, 0.75% max Fe, 0.07% max Ca). C.l. lump, bulk, 22.00c per lb of Si. Packed, c.l. 23.65c, ton lot 24.95c, less ton 25.95c. Add 0.5c for max 0.03% Ca grade. Deduct 0.5c for max 1% Fe grade analyzing min 99.75% Si; 0.75c for max 1.25% Fe grades analyzing min 96.75% Si. Spot, add 0.25c.

Alsifer: (Approx 20% Al, 40% Si, 40% Fe). Contract, basis f.o.b. Niagara Falls, N. Y., lump, carload, bulk, 10.65c per lb of alloy; ton lot, packed, 11.8c.

ZIRCONIUM ALLOYS

12-15% Zirconium Alloy: (Zr 12-15%, Si 39-43%, C 0.20% max). Contract, c.l. lump, bulk 9.25c per lb of alloy. Packed, c.l. 10.45c, ton lot 11.6c, less ton 12.45c. Delivered. Spot, add 0.25c.

35%-40% Zirconium Alloy: (Zr 35-40%, Si 47-52%, Fe 8-12%, C 0.50% max). Contract, carload, lump, packed 27.25c per lb of alloy, ton lot 28.4c, less ton 29.65c. Freight allowed. Spot, add 0.25c.

BORON ALLOYS

Ferroboron: (B 17.50% min, Si 1.50% max, Al 0.50% max, C 0.50% max). Contract, 100 lb or more 1" x D, $1.20 per lb of alloy; less than 100 lb $1.30. Delivered. Spot, add 5c. F.o.b. Washington, Pa., prices, 100 lb and over are as follows: Grade A (10-14% B) 85c per lb; Grade B (14-18% B) $1.20; Grade C (19% min B) $1.50.

Borosil: (3 to 4% B, 40 to 45% Si). Carload, bulk, lump, or 3" x D, $5.25 per lb of contained B. Packed, carload $5.40, ton to c.l. $5.50, less ton $5.60. Delivered.

Bortam: (B 1.5-1.9%). Ton lot, 45c per lb; less than ton lot, 50c per lb.

Carbortam: (B 1 to 2%). Contract, lump, carload 9.50c, per lb f.o.b. Suspension Bridge, N. Y., freight allowed same as high-carbon ferrotitanium.

CALCIUM ALLOYS

Calcium-Manganese-Silicon: (Ca 16-20%, Mn 14-18% and Si 53-59%). Contract, carload, lump, bulk 23c per lb of alloy, carload packed 24.25c, ton lot 26.15c, less ton 27.15c. Delivered. Spot, add 0.25c.

Calcium-Silicon: (Ca 30-33%, Si 60-65%, Fe 1.5-3%). Contract, carload, lump, bulk 24c per lb of alloy, carload packed 25.65c, ton lot 27.95c, less ton 29.45c. Delivered. Spot, add 0.25c.

BRIQUETTED ALLOYS

Chromium Briquets: (Weighing approx 3⅛ lb each and containing 2 lb of Cr). Contract, carload, bulk 19.60c per lb of briquet, carload packed in box pallets 19.80c, in bags 20.70c; 3000 lb to c.l. in box pallets 21.00c; 2000 lb to c.l. in bags, 21.90c; less than 2000 lb in bags 22.80c. Delivered. Add 0.25c for notching. Spot, add 0.25c.

Ferromanganese Briquets: (Weighing approx 3 lb and containing 2 lb of Mn). Contract, carload, bulk 14.8c per lb of briquet; c.l., packed, pallets 15c, bags 16c; 3000 lb to c.l., pallets 16.2c; 2000 lb to c.l., bags, 17.2c; less ton 18.1c. Delivered. Add 0.25c for notching. Spot, add 0.25c.

Silicomanganese Briquets: (Weighing approx 3½ lb and containing 2 lb of Mn and approx ½ lb of Si). Contract, c.l. bulk 15.1c per lb of briquet; c.l. packed, pallets, 15.3c; bags 16.3c, 3000 lb to c.l., pallets, 16.5c; 2000 lb to c.l., bags 17.5c; less ton 18.4c. Delivered. Add 0.25c for notching. Spot, add 0.25c.

Silicon Briquets: (Large size—weighing approx 5 lb and containing 2 lb of Si). Contract, carload, bulk 7.7c per lb of briquet; packed, pallets, 7.9c; bags 8.9c; 3000 lb to c.l., pallets 9.5c; 2000 lb to c.l. bags 10.5c; less ton 11.4c. Delivered. Spot, add 0.25c; (Small size—weighing approx 2½ lb and containing 1 lb of Si.) Carload, bulk 7.85c. Packed, pallets 8.05c; bags 9.05c; 3000 lb to c.l. pallets 9.65c; 2000 lb to c.l., bags, 10.65c; less ton 11.55c. Delivered. Add 0.25c for notching, small size only. Spot, add 0.25c.

Molybdic-Oxide Briquets: (Containing 2½ lb of Mo each). $1.41 per pound of Mo contained, f.o.b. Langeloth, Pa.

TUNGSTEN ALLOYS

Ferrotungsten: (70-80%), 5000 lb W or more $2.95 per lb of contained W; 2000 lb W to 5000 lb W, $3.05; less than 2000 lb W, $3.17. Delivered.

OTHER FERROALLOYS

Ferrocolumbium: (Cb 50-60%, Si 8 % max, C 0.4% max). Contract, ton lot 2" x D, $4.90 per lb of contained Cb. Delivered. Spot, add 10c.

Ferrotantalum—Columbium: (Cb 40% approx, Ta 20% approx, and Cb plus Ta 60% min, C 0.30% max). Ton lot 2" x D, $4.25 per lb of contained Cb plus Ta, delivered; less ton lot $4.30.

SMZ Alloy: (Si 60-65%, Mn 5-7%, Zr 5.7%, Fe 20% approx). Contract, c.l. packed ½-in. x 12 M 20.00c per lb of alloy, ton lot 21.15c, less ton 22.40c. Delivered. Spot, add 0.25c.

Graphidox No. 5: (Si 48-52%, Ca 5-7%, Ti 9-11%). C.l. packed, 19c per lb of alloy, ton lot 20.15c; less ton lot 21.4c, f.o.b. Niagara Falls, N. Y.; freight allowed to St. Louis.

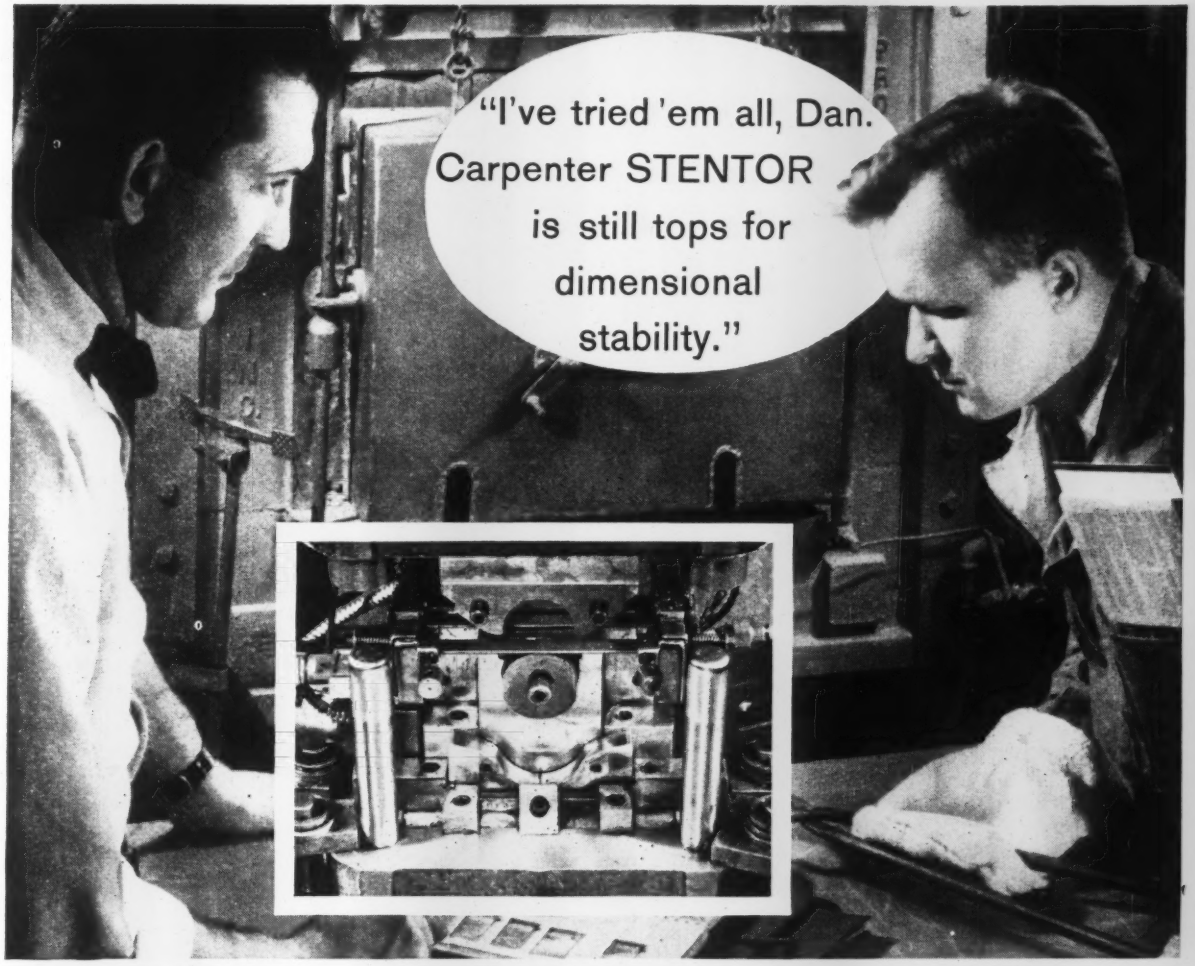
V-5 Foundry Alloy: (Cr 38-42%, Si 17-19%, Mn 8-11%). C.l. packed 18.1c per lb of alloy; ton lot 19.55c; less ton lot 20.8c, f.o.b. Niagara Falls, N. Y., freight allowed to St. Louis.

Simanal: (Approx 20% each Si, Mn, Al; bal Fe). Lump, carload, bulk 18.50c. Packed c.l. 19.50c, 2000 lb to c.l. 20.50c, less than 2000 lb 21c per lb of alloy. Delivered.

Ferrophosphorus: (23-25% based on 24% P content with unitage of $4 for each 1% of P above or below the base); carload, f.o.b. sellers' works. Mt. Pleasant, Siglo, Tenn., $110 per gross ton.

Ferromolybdenum: (55-75%). Per lb of contained Mo, in 200-lb container, f.o.b. Langeloth and Washington, Pa. $1.68 in all sizes except powdered which is $1.74.

Technical Molybdic-Oxide: Per lb of contained Mo, in cans, $1.39; in bags, $1.38, f.o.b. Langeloth and Washington, Pa.



Ten years on the same job has given this heat treater plenty of experience comparing oil-hardening tool and die steels.

As an example of why he rates STENTOR so high, take the dies that just came out of the furnace. They'll be used to form 2½" split ring connectors from SAE or AISI 1010 hot rolled steel.

And they're going to be used "as is" . . . with no grinding or adjusting. STENTOR's freedom from distortion and dimensional change is the answer.

But now Dan is in for the real surprise. STENTOR now has a "built-in" factor of safety. Its broader hardening range of 1425° F to 1525° F makes it the easiest oil-hardening steel to heat treat. It requires no preheat. It offers freedom from decarburization. And machinability is excellent.

If you haven't tried Carpenter STENTOR with its new broader hardening range—do it today. You'll save time and money . . . free yourself of many worries. Your nearby Carpenter SERVICE-CENTER has complete stocks for fast service.

Carpenter

Matched Tool and Die Steels

The Carpenter Steel Co., 139 W. Bern St., Reading, Pa.

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Scrap Advancing at Slower Pace

STEEL's composite on the prime grade moves up another 34 cents, at $37.67 being at the highest level since last October. Mill interest in tonnage still lagging

Scrap Prices, Page 198

Pittsburgh — Leading grades of scrap advanced $1 to $2 a ton here last week following the closing of railroad and industrial lists. No. 1 railroad heavy melting is up $1 at $40-$41, while factory bundles are commanding $40, also up $1.

Market observers think the mills would have to pay $36 for No. 1 heavy melting. There have been no transactions in this grade, though. Cut structurals and No. 2 bundles are in good demand at prices $2 a ton above those quoted a week ago. Demand for the cast iron grades, turnings, and borings remains sluggish.

Philadelphia—While domestic demand for scrap is dull, prices continue strong due to a combination of export demand and a scarcity of material. The decline in metalworking has reduced the volume of factory scrap, and adverse weather has hampered yard collection and preparation. Except for low phos structurals and plates, which are quoted up $2 a ton to $43-$44, delivered, prices are unchanged.

New York—Despite slow collections of yard scrap, brokers' buying prices have leveled off. Domestic demand continues sluggish, and there is somewhat less pressure for export tonnage. Prices throughout the list are unchanged. Low phos structurals and plates are moving so slowly that the market on this grade is entirely nominal.

Boston—While the leading district consumer has posted $30 on No. 1 heavy steel, brokers' buying price, there is little buying at that level. The same is true of No. 1 bundles and No. 1 busheling at $29, No. 2 heavy melting at $22, and No. 2 bundles at $17.

Chicago—Prices are still climbing under persistent bullish pressure, but they have reached a level where they are meeting formidable consumer resistance. In the tug of war which seems imminent, the weight appears to be on the consumers' side.

Cleveland—Despite the continued absence of active mill demand, the tone of the local scrap market continues fairly strong. Prices appear strong through lack of a buying test makes them largely nominal. A little cast scrap buying is being done.

Moderate mill buying in the Valley pushed prices up $2 a ton there, No. 1 heavy melting being quoted $37-$38. The advance in the Valley has served to put Cleveland area prices higher sympathetically.

Youngstown — One large local steelmaker recently bought high quality No. 1 heavy melting, some

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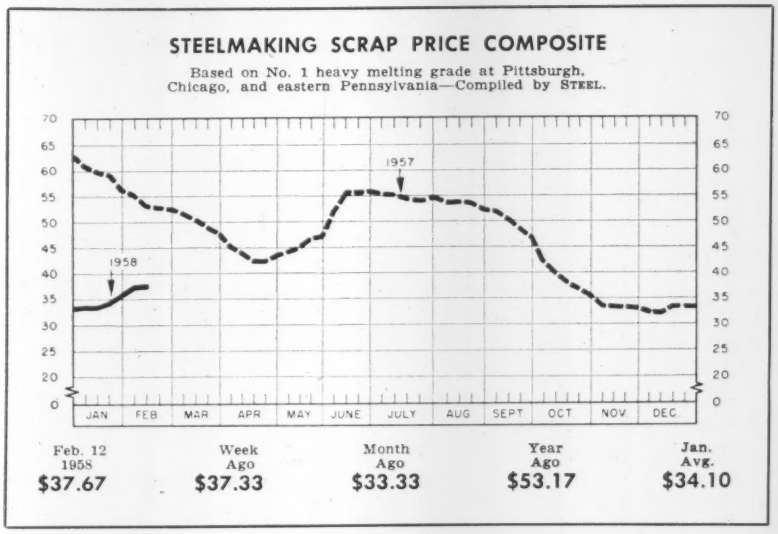

of it at $35, and another lot at $38. These purchases caused a stir in scrap circles since the market here has been languishing for months, with No. 1 heavy melting nominally $31-$32.

Detroit—Dealers and brokers are slightly more optimistic here. The steel foundries are placing a few orders, but most business is slow. Not much change is expected for the next 60 days, possibly longer.

Buffalo—Firmness in cast iron scrap is the only bright spot in the local market. Cupola scrap jumped $3 last week to $40 a ton on good foundry demand and short supplies. No. 1 machinery grade also was marked up $3 a ton to $45.

Brokers are bidding up the better grades of steel scrap a bit, notably No. 1 heavy melting and No. 1 bundles. But this has not been reflected in higher consumer prices.

Cincinnati — While the local scrap market is inactive, prices on the prime grades are up $1 a ton. No. 1 heavy melting is now quoted at $29-$30, brokers' buying price, on limited buying. A firm tone is being maintained despite the absence of substantial mill buying.

St. Louis—The tone of the scrap market has improved a little, with two mills in the district offering to take metal at their prices. Brokers' buying prices on heavy melting steel have moved up $1 to $3 a ton. Cast scrap is scarce. Collections are low.

Birmingham—The largest area buyer of open hearth scrap returned to the market last week, purchasing limited tonnages at $1 to $3 a ton above recent price levels. It bought No. 2 bundles on the basis of one ton for each two tons of No. 2 heavy melting.

Los Angeles—The scrap market here is still marking time. Dealers' stocks are below normal, but collections are down with mill inventories sizable. Expected offshore activity has not materialized.

San Francisco — Steel scrap is moving slowly here. Prices are at a three-year low. Some suppliers have dropped out of the market temporarily.

Seattle—Further weakness has developed in the local scrap market with turnings off $2, now being quoted at $16. Prices are nominal, and yard activity is in keeping with the sluggish market situation.

The export section features a few scattered sales. The drop in exports is reflected in the charter market. Full cargoes are closed only occasionally, compared with extreme activity six months ago.

Recently, two vessels were taken for full cargoes. One was for February-March loading at a North Pacific port at $80,000, free loading and discharge, to a west Italian port. Another was at $68, West Coast to Japan. These rates are one-third those prevaling less than a year ago.

Pig Iron . . .

Pig Iron Prices, Page 192

Shipments of merchant pig iron have declined slightly. The 40-cent increase in freight rates which is about to go into effect eliminates the need for protective covering by consumers.

Consumption of iron shows no gain. Most consumers doubt there will be any material improvement during the next few weeks unless it is at the pipe shops.

Activity at foundries is spotty, with operations averaging close to three days a week. They are covering only for immediate needs, which remain small. February, like January, is being written off as a poor month.

Blast furnace operators continue to curtail production due to lack of demand.

Structural Shapes . . .

Structural Shape Prices, Page 187

Most structural shops are busy, but new bookings continue to slide, and backlogs are shrinking. Competition is increasing—not only are prices being whittled, but fabricators are going farther afield for tonnage. In some cases, they are seeking types of work they normally would ignore.

(*Please turn to Page* 203)

QUANTITY PRODUCTION OF GREY IRON CASTINGS
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ESTABLISHED 1866
THE WHELAND COMPANY
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Iron and Steel Scrap

Consumer prices per gross ton, except as otherwise noted, including brokers' commission, as reported to STEEL, Feb. 12, 1958. *Changes shown in italics.*

STEELMAKING SCRAP COMPOSITE

Feb. 12	$37.67
Feb. 5	37.33
Jan. Avg.	34.10
Feb. 1957	53.41
Feb. 1953	43.00

Based on No. 1 heavy melting grade at Pittsburgh, Chicago, and eastern Pennsylvania.

PITTSBURGH

No. 1 heavy melting	*35.00-36.00*
No. 2 heavy melting	*33.00-34.00*
No. 1 dealer bundles	*35.00-36.00*
No. 2 bundles	*31.00-32.00*
No. 1 busheling	*35.00-36.00*
No. 1 factory bundles	*39.00-40.00*
Machine shop turnings	17.00-18.00
Mixed borings, turnings	17.00-18.00
Short shovel turnings	*21.00-22.00*
Cast iron borings	21.00-22.00
Cut structurals:	
2 ft and under	*40.00-41.00*
3 ft lengths	*39.00-40.00*
Heavy turnings	*34.00-35.00*
Punchings & plate scrap	*39.00-40.00*
Electric furnace bundles	*39.00-40.00*

Cast Iron Grades

No. 1 cupola	39.00-40.00
Stove plate	39.00-40.00
Unstripped motor blocks	26.00-27.00
Clean auto cast	42.00-43.00
Drop broken machinery	49.00-50.00

Railroad Scrap

No. 1 R.R. heavy melt.	*40.00-41.00*
Rails, 2 ft and under	*56.00-57.00*
Rails, 18 in. and under	*57.00-58.00*
Angles, splice bars	*49.00-50.00*
Rails, rerolling	*57.00-58.00*

Stainless Steel Scrap

18-8 bundles & solids	*185.00-190.00*
18-8 turnings	95.00-100.00
430 bundles & solids	95.00-100.00
430 turnings	50.00-55.00

CLEVELAND

No. 1 heavy melting	*33.00-34.00*
No. 2 heavy melting	21.00-22.00
No. 1 factory bundles	*33.00-34.00*
No. 1 bundles	*33.00-34.00*
No. 2 bundles	*23.00-24.00*
No. 1 busheling	*33.00-34.00*
Machine shop turnings	11.00-12.00
Short shovel turnings	15.00-16.00
Mixed borings, turnings	15.00-16.00
Cast iron borings	15.00-16.00
Cut foundry steel	36.00-37.00
Cut structurals, plates 2 ft and under	*41.00-42.00*
Low phos. punchings & plate	*34.00-35.00*
Alloy free, short shovel turnings	19.00-20.00
Electric furnace bundles	*34.00-35.00*

Cast Iron Grades

No. 1 cupola	44.00-45.00
Charging box cast	36.00-37.00
Heavy breakable cast	*36.00-37.00*
Stove plate	*43.00-44.00*
Unstripped motor blocks	26.00-27.00
Brake shoes	34.00-35.00
Clean auto cast	45.00-46.00
Burnt cast	*33.00-34.00*
Drop broken machinery	*48.00-49.00*

Railroad Scrap

R.R. malleable	*60.00-61.00*
Rails, 2 ft and under	57.00-58.00
Rails, 18 in. and under	58.00-59.00
Rails, random lengths	50.00-51.00
Cast steel	47.00-48.00
Railroad specialties	51.00-52.00
Uncut tires	41.00-42.00
Angles, splice bars	51.00-52.00
Rails, rerolling	56.00-57.00

Stainless Steel

(Brokers' buying prices; f.o.b. shipping point)

18-8 bundles, solids	160.00-165.00
18-8 turnings	90.00-95.00
430 clips, bundles, solids	75.00-80.00
430 turnings	40.00-50.00

YOUNGSTOWN

No. 1 heavy melting	*37.00-38.00*
No. 2 heavy melting	25.00-26.00
No. 1 busheling	*37.00-38.00*
No. 1 bundles	*37.00-38.00*
No. 2 bundles	24.00-25.00
Machine shop turnings	13.00-14.00
Short shovel turnings	17.00-18.00
Cast iron borings	17.00-18.00
Low phos.	*38.00-39.00*
Electric furnace bundles	*37.00-38.00*

Railroad Scrap

No. 1 R.R. heavy melt.	*42.00-43.00*

CHICAGO

No. 1 heavy melt., indus.	40.00-41.00
No. 1 hvy melt., dealer	37.00-38.00
No. 2 heavy melting	*34.00-35.00*
No. 1 factory bundles	*41.00-42.00*
No. 1 dealer bundles	*38.00-39.00*
No. 2 bundles	*29.00-30.00*
No. 1 busheling, indus.	40.00-41.00
No. 1 busheling, dealer	37.00-38.00
Machine shop turnings	*21.00-22.00*
Mixed borings, turnings	*23.00-24.00*
Short shovel turnings	*23.00-24.00*
Cast iron borings	*23.00-24.00*
Cut structurals, 3 ft	*40.00-41.00*
Punchings & plate scrap	46.00-47.00

Cast Iron Grades

No. 1 cupola	42.00-43.00
Stove plate	37.00-38.00
Unstripped motor blocks	33.00-34.00
Clean auto cast	46.00-47.00
Drop broken machinery	46.00-47.00

Railroad Scrap

No. 1 R.R. heavy melt.	39.00-40.00
R.R. malleable	54.00-55.00
Rails, 2 ft and under	*58.00-59.00*
Rails, 18 in. and under	*59.00-60.00*
Angles, splice bars	*53.00-54.00*
Axles	*56.00-57.00*
Rails, rerolling	*56.00-57.00*

Stainless Steel Scrap

18-8 bundles & solids	160.00-165.00
18-8 turnings	85.00-90.00
430 bundles & solids	90.00-100.00
430 turnings	47.50-52.50

DETROIT

(Brokers' buying prices; f.o.b. shipping point)

No. 1 heavy melting	*29.00-30.00*
No. 2 heavy melting	23.00-24.00
No. 1 bundles	*30.00-31.00*
No. 2 bundles	*20.00-21.00*
No. 1 busheling	*27.00-28.00*
Machine shop turnings	9.00-10.00
Mixed borings, turnings	10.00-11.00
Short shovel turnings	11.00-12.00
Punchings & plate	29.00-30.00

Cast Iron Grades

No. 1 cupola	29.00-30.00
Stove plate	25.00-26.00
Charging box cast	*25.00-26.00*
Heavy breakable	24.00-25.00
Unstripped motor blocks	16.00-17.00
Clean auto cast	33.00-34.00
Malleable	32.00†

†Nominal

ST. LOUIS

(Brokers' buying prices)

No. 1 heavy melting	*33.00*
No. 2 heavy melting	*30.00*
No. 1 bundles	*33.00*
No. 2 bundles	*25.00*
No. 1 busheling	*33.00*
Machine shop turnings	*19.00*
Short shovel turnings	*21.00*

Cast Iron Grades

No. 1 cupola	42.00
Charging box cast	32.00
Heavy breakable cast	32.00
Unstripped motor blocks	32.00
Clean auto cast	44.00
Stove plate	39.00

Railroad Scrap

No. 1 R.R. heavy melt.	37.00
Rails, 18 in. and under	51.00
Rails, random lengths	46.00
Rails, rerolling	53.50
Angles, splice bars	47.50

PHILADELPHIA

No. 1 heavy melting	38.50
No. 2 heavy melting	35.00
No. 1 bundles	38.50
No. 2 bundles	28.00
No. 1 busheling	38.50
Electric furnace bundles	40.00
Mixed borings, turnings	22.50†
Short shovel turnings	24.00†
Machine shop turnings	22.00†
Heavy turnings	34.00†
Structurals & plate	*43.00-44.00*
Couplers, springs, wheels	46.00
Rail crops, 2 ft & under	58.00-60.00

Cast Iron Grades

No. 1 cupola	38.00
Heavy breakable cast	40.00
Malleable	58.00
Drop broken machinery	49.00

†Nominal

NEW YORK

(Brokers' buying prices)

No. 1 heavy melting	36.00-37.00
No. 2 heavy melting	32.00-33.00
No. 1 bundles	36.00-37.00
No. 2 bundles	24.00-25.00
Machine shop turnings	11.00-12.00
Mixed borings, turnings	12.00-13.00
Short shovel turnings	14.00-15.00
Low phos. (structurals & plate)	Nominal

Cast Iron Grades

No. 1 cupola	34.00-35.00
Unstripped motor blocks	32.00
Heavy breakable	32.00-33.00

Stainless Steel

18-8 sheets, clips, solids	140.00-150.00
18-8 borings, turnings	50.00
410 sheets, clips, solids	60.00-65.00
430 sheets, clips, solids	75.00-80.00

BOSTON

(Brokers' buying prices; f.o.b. shipping point)

No. 1 heavy melting	*30.00*
No. 2 heavy melting	*22.00*
No. 1 bundles	*29.00*
No. 2 bundles	*17.00*
No. 1 busheling	*29.00*
Machine shop turnings	9.50-10.00†
Mixed borings, turnings	9.50-10.00
Short shovel turnings	11.00-11.50†
No. 1 cast	29.00-30.00
Mixed cupola cast	28.00-29.00
No. 1 machinery cast	35.00-36.00

†Nominal

BUFFALO

No. 1 heavy melting	28.00-29.00
No. 2 heavy melting	25.00-26.00
No. 1 bundles	28.00-29.00
No. 2 bundles	23.00-24.00
No. 1 busheling	28.00-29.00
Mixed borings, turnings	14.00-15.00
Machine shop turnings	12.00-13.00
Short shovel turnings	15.00-16.00
Cast iron borings	14.00-15.00
Low phos.	32.00-33.00

Cast Iron Grades (F.o.b. shipping point)

No. 1 cupola	*39.00-40.00*
No. 1 machinery	*44.00-45.00*

Railroad Scrap

Rails, random lengths	39.00-40.00
Rails, 3 ft and under	46.00-47.00
Railroad specialties	33.00-34.00

CINCINNATI

(Brokers' buying prices; f.o.b shipping point)

No. 1 heavy melting	*29.00-30.00*
No. 2 heavy melting	24.50-25.50
No. 1 bundles	*29.00-30.00*
No. 2 bundles	23.00-24.00
No. 1 busheling	*29.00-30.00*
Machine shop turnings	14.00-15.00
Mixed borings, turnings	15.00-16.00
Short shovel turnings	17.00-18.00
Cast iron borings	15.00-16.00
Low phos. 18 in.	*37.00-38.00*

Cast Iron Grades

No. 1 cupola	38.00-39.00
Heavy breakable cast	33.00-34.00
Charging box cast	33.00-34.00
Drop broken machinery	47.00-48.00

Railroad Scrap

No. 1 R.R. heavy melt.	34.00-35.00
Rails, 18 in. and under	54.00-55.00
Rails, random lengths	44.00-45.00

BIRMINGHAM

No. 1 heavy melting	*31.00-32.00*
No. 2 heavy melting	*27.00-28.00*
No. 1 bundles	*31.00-32.00*
No. 2 bundles	*20.00-21.00*
No. 1 busheling	31.00-32.00
Cast iron borings	12.00-13.00
Machine shop turnings	23.00-24.00
Short shovel turnings	24.00-25.00
Bar crops and plates	39.00-40.00
Structurals & plate	*38.00-39.00*
Electric furnace bundles	36.00-37.00
Electric furnace:	
2 ft and under	35.00-36.00
3 ft and under	34.00-35.00

Cast Iron Grades

No. 1 cupola	49.00-50.00
Stove plate	49.00-50.00
Unstripped motor blocks	39.00-40.00
Charging box cast	22.00-23.00
No. 1 wheels	*38.00-39.00*

Railroad Scrap

No. 1 R.R. heavy melt.	*36.00-37.00*
Rails, 18 in. and under	49.00-50.00
Rails, rerolling	45.00-46.00
Rails, random lengths	42.00-43.00
Angles, splice bars	42.00-43.00

SEATTLE

No. 1 heavy melting	28.00
No. 2 heavy melting	26.00
No. 1 bundles	22.00
No. 2 bundles	21.00
Machine shop turnings	18.00
Mixed borings, turnings	18.00
Electric furnace No. 1	38.00

Cast Iron Grades

No. 1 cupola	31.00
Heavy breakable cast	28.00
Unstripped motor blocks	23.00
Stove plate (f.o.b. plant)	21.00

LOS ANGELES

No. 1 heavy melting	32.00
No. 2 heavy melting	31.00
No. 1 bundles	28.00
No. 2 bundles	21.00
Machine shop turnings	12.00
Shoveling turnings	15.00
Cast iron borings	15.00
Cut structurals and plate 1 ft and under	48.00

Cast Iron Grades (F.o.b. shipping point)

No. 1 cupola	41.00

Railroad Scrap

No. 1 R.R. heavy melt.	36.00

SAN FRANCISCO

No. 1 heavy melting	32.00
No. 2 heavy melting	30.00
No. 1 bundles	30.00
No. 2 bundles	22.00
Machine shop turnings	15.00
Mixed borings, turnings	15.00
Cast iron borings	15.00
Heavy turnings	15.00
Short shovel turnings	15.00
Cut structurals, 3 ft.	40.00

Cast Iron Grades

No. 1 cupola	40.00
Charging box cast	34.00
Stove plate	34.00
Heavy breakable cast	28.00
Unstripped motor blocks	31.00
Clean auto cast	40.00
Drop broken machinery	40.00
No. 1 wheels	34.00

HAMILTON, ONT.

No. 1 heavy melting	32.00
No. 2 heavy melting	27.00
No. 1 bundles	32.00
No. 2 bundles	22.00
Mixed steel scrap	27.00
Mixed borings, turnings	17.00
Busheling, new factory:	
Prepared	32.00
Unprepared	26.00
Short steel turnings	21.00

Cast Iron Grades†

No. 1 machinery cast	45.00-50.00

†F.o.b. Hamilton, Ont.

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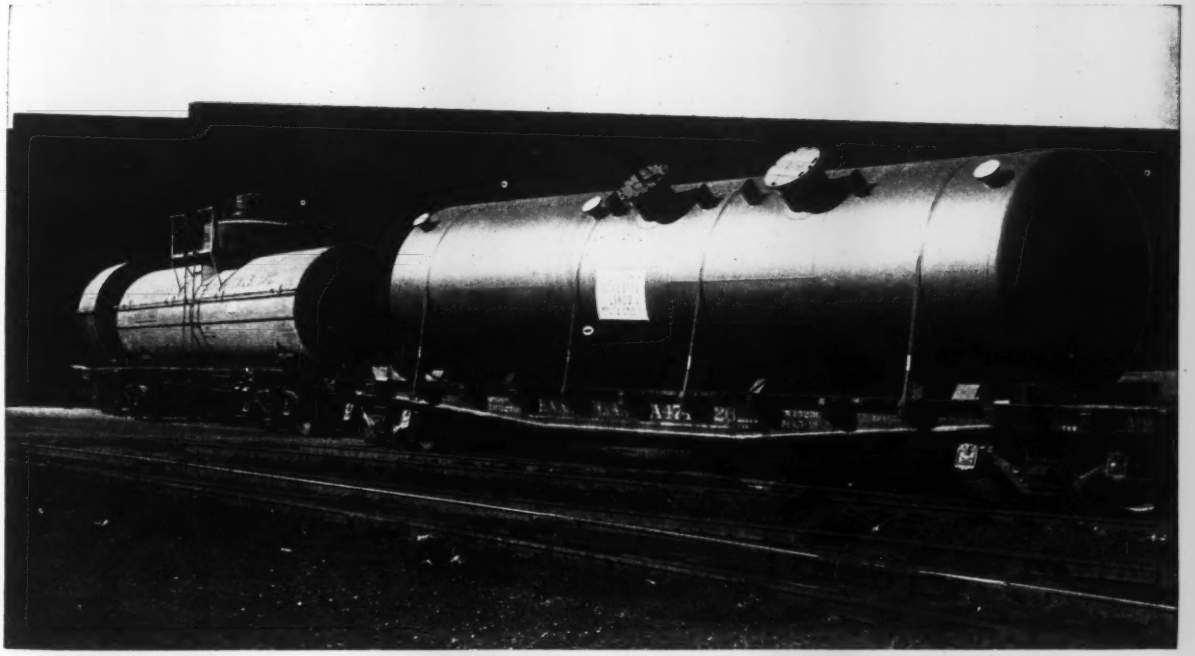

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Aluminum Output To Rise

Even with production curtailments and stretchouts in expansion primary output this year may reach an all-time high. Metal markets are still in the doldrums

Nonferrous Metal Prices, Pages 202 & 203

PRIMARY PRODUCTION of aluminum is headed for an all-time high in 1958 despite recent slashes in output. Even if the industry produces at a little under the current operating rate of 85 per cent of capacity the rest of the year, it will probably turn out more pig than it did in record '56 (1,679,000 tons). Last year, production was 1,649,000 tons.

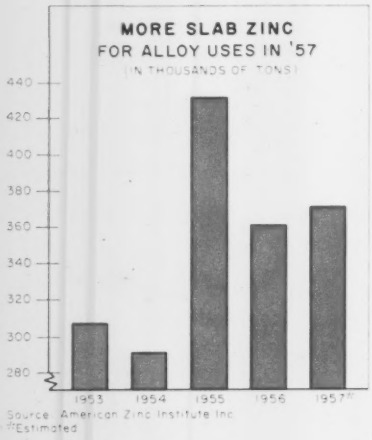
Here's why: The industry entered 1958 with a rated capacity of 1,839,000 tons. Since then, Kaiser Aluminum & Chemical Corp. has brought in another potline at its Mead, Wash., facilities, and Reynolds Metals Co. has added a potline to its Listerhill, Ala., Works. Current rated capacity is 1,915,500 tons. The breakdown: Aluminum Co. of America, 792,500 tons, Kaiser, 537,000 tons, Reynolds, 526,000 tons, and Anaconda Aluminum Co., 60,000 tons.

Before the year is out, Ormet Corp. will be operating at an annual rate of 180,000 tons, and Reynolds will have added 75,000 more tons at its Listerhill plant. The additions would hike U. S. capacity to 2,170,500 tons. If Kaiser decides to bring in its two remaining potlines at Ravenswood this year, another 72,500 tons would be added.

Output — At current operating rates, Alcoa could produce 600,000 tons this year (77 per cent of capacity); Reynolds, 500,000 tons (95 per cent); Kaiser, 490,000 tons (90 per cent); and Anaconda, 50,000 tons (88 per cent). Ormet will go into production with the first of its ten potlines in the spring and will continue to add more potlines as the year progresses. Observers guess the firm will turn out about 60,000 tons this year. Reynolds' Listerhill expansion may bring the firm's 1958 production up to 542,000 tons.

Assuming current levels of operation continue throughout the year and the added production comes in as expected, the domestic industry will turn out around 1,742,000 tons of primary aluminum.

Canada—The big Canadian producer, Aluminium Ltd., has cut back production to 80 per cent of its rated 770,000-ton capacity. At this pace, the company will turn out around 616,000 tons in 1958, compared with an estimated 560,000 tons last year.



Nicaro Delayed Again?

Sale of the government's nickel facility at Nicaro, Cuba, is still up in the air. The operating contract with National Lead Co., originally slated to expire at the end of 1957, may be extended again.

Negotiations with the Cuban government on the tax situation which the future owner will face have not been completed, says the General Services Administration. GSA points out the U. S. and Cuba have not necessarily reached a stalemate but that a great deal of protocol is involved in deals of this sort.

Zinc Still Slow

Sales continue to droop along at the low levels of January. Especially disappointing is the slump in orders from diecasters. Diecastings, the chief item in the zinc-base alloy category, was the only major area that showed a sales gain last year (see chart).

Metal Prices Weak

Probably the only reason lead hasn't fallen below 13 cents a pound is that buyers don't seem interested enough to come into the market at any price. Dealers are reportedly offering at 11.25 cents a pound, delivered New York, and still can sell only modest amounts. The London Metal Exchange price continues to hover at slightly over 9 cents a pound.

Custom smelted copper could drop below its present 24 cents a pound at any time. Factors: 1. Sales are extremely poor. 2. The LME is down to slightly over 20 cents a pound. 3. Katanga has reduced its quotation to 20.89 cents a pound, c.i.f. New York.

NONFERROUS PRICE RECORD

	Price Feb. 12	Last Change	Previous Price	Jan. Avg	Dec. Avg	Feb., 1957 Avg
Aluminum ..	26.00	Aug. 1, 1957	25.00	26.000	26.000	25.000
Copper	24.00-25.00	Jan. 21, 1958	24.50-25.00	25.135	26.130	32.863
Lead	12.80	Dec. 2, 1957	13.30	12.800	12.800	15.800
Magnesium .	35.25	Aug. 13, 1956	33.75	35.250	35.250	35.250
Nickel	74.00	Dec. 6, 1956	64.50	74.000	74.000	74.000
Tin	93.00	Feb. 11, 1958	92.75	92.933	92.395	101.159
Zinc	10.00	July 1, 1957	10.50	10.000	10.000	13.500

Quotations in cents per pound based on: COPPER, mean of primary and secondary, deld. Conn. Valley; LEAD, common grade, deld. St. Louis; ZINC, prime western, E. St. Louis; TIN, Straits, deld. New York; NICKEL, electrolytic cathodes, 99.9%, base size at refinery, unpacked; ALUMINUM, primary pig, 99.5+%, f.o.b. shipping point; MAGNESIUM, pig, 99.8%, Velasco, Tex.

How one precise adjustment started a new era in stamped metal production

It was back in 1954. A group of Wean Equipment Corporation executives and engineers were gathered around a bench-size prototype of an idea; an idea for a new kind of stamping press so revolutionary that it was decided to build a scale model embodying the principle before any development work was done on full-size equipment.

The group watched the Wean research director who had conceived and built the model make a careful final check; involuntarily held its breath while the switch was thrown. Nothing happened. In the short silence that followed no one moved . . . until, with a muttered comment, the research director directed one sharp blow at the side frame of the model with a lead hammer lying nearby.

The resulting clatter of the press, galvanized into action by this unexpected persuasion, heralded a new era in metalworking. For the "Flying Press" principle was first proved practical in that bench model; has been proved time and again in production size presses of from 20 to 300 ton capacity installed in forward-looking stamping plants.

We say "new era" because the "Flying Press" permits metal to be stamped and formed from coil without stationary indexing of the strip as it passes through the press. This continuous, uniform motion of metal through the "Flying Press" results in higher parts production from the same dies used in ordinary presses. But perhaps more importantly for the future, the "Flying Press" principle is unique, in that it matches press operation to the continuous-flow production techniques necessary for automated operations.

If you use stamping presses, you should know about this unique development that permits speeds never before possible while offering tooling protection, reduced die maintenance, and vastly reduced press maintenance requirements. There are too many other advantages of the Wean "Flying Press" to discuss here, but we've summarized them in a brochure. We'll be glad to send you this literature on request.

WEAN

WEAN EQUIPMENT CORPORATION

CLEVELAND 17, OHIO

Detroit • Chicago • Newark

Nonferrous Metals

Cents per pound, carlots except as otherwise noted.

PRIMARY METALS AND ALLOYS

Aluminum: 99.5%, pigs, 26.00; ingots, 28.10, 10,000 lb or more, f.o.b. shipping point. Freight allowed on 500 lb or more.

Aluminum Alloy: No. 13, 29.90; No. 43, 29.70; No. 195, 31.30; No. 241, 31.50; No. 356, 29.90, 30-lb ingots.

Antimony: R.M.M. brand, 99.5%, 33.00; Lone Star brand, 33.50, f.o.b. Laredo, Tex., in bulk. Foreign brands, 99.5%, 25.50-26.50, New York, duty paid, 10,000 lb or more.

Beryllium: 97% lump or beads, $71.50 per lb, f.o.b. Cleveland or Reading, Pa.

Beryllium Aluminum: 5% Be, $74.75 per lb of contained Be, with balance as Al at market price, f.o.b. shipping point.

Beryllium Copper: 3.75-4.25% Be, $43 per lb of contained Be, with balance as Cu at market price on shipment date, f.o.b. shipping point.

Bismuth: $2.25 per ton, ton lots.

Cadmium: Sticks and bars, $1.55 per lb deld.

Cobalt: 97-99%, $2.00 per lb for 550-lb keg; $2.02 per lb for 100 lb case; $2.07 per lb under 100 lb.

Columbium: Powder, $55-90 per lb, nom.

Copper: Electrolytic, 25.00 deld.; custom smelters, 24.00; lake, 25.00 deld.; fire refined, 24.75 deld.

Germanium: First reduction, $179.17-197.31 per lb; intrinsic grade, $197.31-220 per lb, depending on quantity.

Gold: U. S. Treasury, $35 per oz.

Indium: 99.9%, $2.25 per troy oz.

Iridium: $70-90 nom. per troy oz.

Lead: Common, 12.80; chemical, 12.90; corroding, 12.90, St. Louis, New York basis, add 0.20.

Lithium: 98 + %, 50-100 lb, cups or ingots, $12; rod, $15; shot or wire, $16. 100-500 lb, cups or ingots, $10.50; rod, $14; shot or wire, $15, f.o.b. Minneapolis.

Magnesium: Pig, 35.25; ingot, 36.00 f.o.b. Velasco, Tex.; 12 in. thick, 59.00 f.o.b. Madison, Ill.

Magnesium Alloys: AZ91A (diecasting), 40.75 deld.; AZ63A, AZ92A, AZ91C (sand casting), 40.75, f.o.b. Velasco, Tex.

Mercury: Open market, spot, New York, $220-225 per 76-lb flask.

Molybdenum: Unalloyed, turned extrusions, 3.75-5.75 in. round, $9.60 per lb in lots of 2500 lb or more, f.o.b. Detroit.

Nickel: Electrolytic cathodes, sheets (4 x 4 in. and larger), unpacked, 74.00; 10-lb pigs, unpacked, 78.25; "XX" nickel shot, 79.50; "F" nickel shot for addition to cast iron, 74.50; "F" nickel, 5 lb ingots in kegs for addition to cast iron, 75.50. Prices f.o.b. Port Colborne, Ont., including import duty. New York basis, add 1.01. Nickel oxide sinter, 71.25 per lb of nickel content before 1 cent freight allowance, f.o.b. Copper Cliff, Ont.

Osmium: $70-100 per troy oz nom.

Palladium: $19-21 per troy oz.

Platinum: $74-80 per troy oz from refineries.

Radium: $16-21.50 per mg radium content, depending on quantity.

Rhodium: $118-125 per troy oz.

Ruthenium: $45-55 per troy oz.

Selenium: $7.50 per lb, commercial grade.

Silver: Open market, 88.625 per troy oz.

Sodium: 16.50, c.l.; 17.00 l.c.l.

Tantalum: Rod, $60 per lb; sheet, $55 per lb.

Tellurium: $1.65-1.85 per lb.

Thallium: $7.50 per lb.

Tin: Straits, N. Y., spot, 93.00; prompt, 92.75.

Titanium: Sponge, 99.3+ %, grade A-1 ductile (0.3% Fe max.), $2.25; grade A-2 (0.5% Fe max.), $2.00 per lb.

Tungsten: Powder, 98.8%, carbon reduced, 1000-lb lots, $3.15 per lb nom., f.o.b. shipping point; less than 1000 lb, add 15.00; 99+% hydrogen reduced, $3.85.

Zinc: Prime Western, 10.00; brass special, 10.25; intermediate, 10.50, East St. Louis, freight allowed over 0.50 per lb, New York basis, add 0.50. High grade, 11.35; special high grade, 11.75 deld. Diecasting alloy ingot No. 3, 14.25; No. 2, 15.25; No. 5, 14.75 deld.

Zirconium: Sponge, commercial grade, $5-10 per lb.

(Note: Chromium, manganese, and silicon metals are listed in ferroalloy section.)

SECONDARY METALS AND ALLOYS

Aluminum Ingot: Piston alloys, 23.00-25.50; No. 12 foundry alloy (No. 2 grade), 21.00-23.25; 5% silicon alloy, 0.60 Cu max., 25.00-26.25; 13 alloy, 0.60 Cu max., 25.00-26.25; 195 alloy, 24.00-27.00; 108 alloy, 21.50-23.25. Steel deoxidizing grades, notch bars, granulated or shot: Grade 1, 23.00; grade 2, 21.25; grade 3, 20.00; grade 4, 18.00.

Brass Ingot: Red brass, No. 115, 25.75; tin bronze, No. 225, 34.50; No. 245, 29.25; high-leaded tin bronze, No. 305, 29.75; No. 1 yellow, No. 405, 21.25; manganese bronze, No 421, 23.00.

Magnesium Alloy Ingot: AZ63A, 37.50; AZ91B, 37.50; AZ91C, 41.25; AZ92A, 37.50.

NONFERROUS PRODUCTS

BERYLLIUM COPPER

(Base prices per lb, plus mill extras, 2000 to 5000 lb; nom. 1.9% Be alloy.) Strip, $1.80, f.o.b. Temple, Pa., or Reading, Pa.; rod, bar, wire, $1.78, f.o.b. Temple, Pa.

COPPER WIRE

Bare, soft, f.o.b. eastern mills, 30,000-lb lots, 30.355; l.c.l., 30.98. Weatherproof, 30,000-lb lots, 32.53; l.c.l., 33.28. Magnet wire deld., 38.43, before quantity discounts.

LEAD

(Prices to jobbers, f.o.b. Buffalo, Cleveland, Pittsburgh.) Sheets, full rolls, 140 sq ft or more, $18.50 per cwt; pipe, full coils, $18.50 per cwt; traps and bends, list prices plus 30%.

TITANIUM

(Prices per lb, 10,000 lb and over, f.o.b. mill.) Sheets and strip, $9.50-15.95; sheared mill plate, $8.00-11.50; wire, $7.50-11.50; forging billets, $6.00-7.60; hot-rolled and forged bars, $6.15-7.90.

ZINC

(Prices per lb, c.l., f.o.b. mill.) Sheets, 24.00; Plate, $12.50-19.20; H.R. strip, $12.50-22.90;

ZIRCONIUM

C.R. strip, $15.00-31.25; forged or H.R. bars, ribbon zinc in coils, 20.50; plates 19.00. $11.00-17.40.

NICKEL, MONEL, INCONEL

	"A" Nickel	Monel	Inconel
Sheets, C.R.	126	106	128
Strips, C.R.	124	108	138
Plate, H.R.	120	105	121
Rod, Shapes, H.R.	107	89	109
Seamless Tubes	157	129	200

ALUMINUM

Sheets: 1100 and 3003 mill finish (30,000 lb base; freight allowed).

Thickness Range Inches	Flat Sheet	Coiled Sheet
0.249-0.136	43.10-47.60	.....
0.135-0.096	43.60-48.70	40.50-41.10
0.095-0.077	44.30-50.50	40.60-41.30
0.076-0.061	44.90-52.80	40.80-42.00
0.060-0.048	45.60-55.10	41.40-43.10
0.047-0.038	46.20-57.90	41.90-44.50
0.037-0.030	46.60-62.90	42.30-46.30
0.029-0.024	47.20-54.70	42.60-47.00
0.023-0.019	48.20-58.10	43.70-45.40
0.018-0.017	49.00-55.40	44.30-46.00
0.016-0.015	49.90-56.30	45.10-46.80
0.014	50.90	46.10-47.80
0.013-0.012	52.10	46.80
0.011	53.10	48.00
0.010-0.0095	54.60	49.40
0.009-0.0085	55.90	50.90
0.008-0.0075	57.50	52.10
0.007	59.00	53.60
0.006	60.60	55.00

ALUMINUM (continued)

Plates and Circles: Thickness 0.250-3 in., 24-60 in. width or diam., 72-240 in. lengths.

Alloy	Plate Base	Circle Base
1100-F, 3003-F	42.70	47.50
5050-F	43.80	48.60
3004-F	44.80	50.50
5052-F	44.40	51.20
6061-T6	46.90	53.00
2024-T4	50.60	57.40
7075-T6*	58.40	66.00

*24-48 in. width or diam., 72-180 in. lengths.

Screw Machine Stock: 30,000 lb base.

Diam.(in.)or across flats	——Round—— 2011-T3	2017-T4	—Hexagonal— 2011-T3	2017-T4
Drawn				
0.125	78.20	75.20	....	....
0.156-0.172	66.20	63.40	....	....
0.188	66.20	63.40	....	81.60
0.219-0.234	63.00	61.50	....	....
0.250-0.281	63.00	61.50	....	77.90
0.313	63.00	61.50	....	74.20
0.344	62.50	....	....	....
Cold-Finished				
0.375-0.547	62.50	61.30	74.80	69.80
0.563-0.688	62.50	61.30	71.10	65.50
0.719-1.000	61.00	59.70	64.90	61.70
1.063	61.00	59.70	....	59.60
1.125-1.500	58.60	57.40	62.80	59.60
Rolled				
1.563	57.00	55.70	....	....
1.625-2.000	56.30	54.90	....	57.50
2.125-2.500	54.80	53.40	....	....
2.563-3.375	53.20	51.70	....	....

Forging Stock: Round, Class 1, random lengths: 2014-F, 46.90-53.90, diam. 1-8 in.; 6061-F, 43.50-53.90, diam. 1-6 in.; 7075-F, 63.50-73.90, diam. 1-3.875 in.; 7079-F, 68.50-78.90, diam. 1-3.875 in.

Pipe: ASA schedule 40, alloy 6063-T6, standard lengths, plain ends, 90,000-lb base, per 100 ft.

Nom. Pipe Size (in.)		Nom. Pipe Size (in.)	
¾	$19.40	2	$ 59.90
1	30.50	4	165.05
1¼	41.30	6	296.10
1½	49.40	8	445.55

Extruded Solid Shapes:

Factor	Alloy 6063-T5	Alloy 6062-T6
9-11	45.40-47.00	60.60-64.80
12-14	45.70-47.20	61.30-65.80
15-17	45.90-47.90	62.50-67.50
18-20	46.50-48.30	64.50-70.10

MAGNESIUM

Sheet and Plate: AZ31B standard grade, 0.32 in., 103.10; .081 in., 77.90; .125 in., 70.40; .188 in., 69.00; .250-2.0 in., 67.90. AZ31B spec. grade, .032 in., 171.30; .081 in., 108.70; .125 in., 98.10; .188 in., 95.70; .250-2.00 in., 93.30. Tread plate, 60-192 in. lengths, 24-72 in. widths; .125 in., 74.90; .188 in., 71.70-72.70; .25-.75 in., 70.60-71.60. Tooling plate, .25-3.0 in., 73.00.

Extruded Solid Shapes:

Factor	Com. Grade (AZ31C)	Spec. Grade (AZ31B)
6-8	69.60-72.40	84.60-87.40
12-14	70.70-73.00	85.70-88.00
24-26	75.60-76.30	90.60-91.30
36-38	89.20-90.30	104.20-105.30

NONFERROUS SCRAP

DEALER'S BUYING PRICES

(Cents per pound, New York, in ton lots.)

Aluminum: 1100 clippings, 13.50-14.00; old sheets, 10.50-11.00; borings and turnings, 6.50-

BRASS MILL PRICES

	MILL PRODUCTS a				SCRAP ALLOWANCES f		
	Sheet, Strip, Plate	Rod	Wire	Seamless Tubes	Clean Heavy	Rod Ends	Clean Turnings
Copper	48.13b	45.36c	....	48.32	21.000	21.000	20.250
Yellow Brass	42.69	31.03d	43.23	45.60	16.125	15.875	14.500
Low Brass, 80%	44.90	44.84	45.44	47.71	17.875	17.625	17.125
Red Brass, 85%	45.67	45.61	46.21	48.48	18.625	18.375	17.875
Com. Bronze, 90%	46.98	46.92	47.52	49.54	19.250	19.000	18.500
Manganese Bronze	50.73	44.91	55.44	....	15.000	14.750	14.125
Muntz Metal	45.19	41.00	....	....	15.125	14.875	14.375
Naval Brass	47.07	41.38	54.13	50.48	14.875	14.625	14.125
Silicon Bronze	52.84	52.03	52.88	58.18	20.625	20.375	19.625
Nickel Silver, 10%	57.93	60.26	60.26	....	21.125	20.875	10.562
Phos. Bronze, A-5%	67.17	67.67	67.67	68.85	21.875	21.625	20.625

a. Cents per lb, f.o.b. mill; freight allowed on 500 lb or more. b. Hot-rolled. c. Cold-drawn. d. Free cutting. e. Prices in cents per lb for less than 20,000 lb, f.o.b. shipping point. On lots over 20,000 lb at one time, or any or all kinds of scrap, add 1 cent per lb.

7.00; crankcases, 10.50-11.00; industrial castings, 10.50-11.00.

Copper and Brass: No. 1 heavy copper and wire, 17.00-17.50; No. 2 heavy copper and wire, 15.00-15.50; light copper, 13.00-13.50; No. 1 composition red brass, 14.50-15.00; No. 1 composition turnings, 13.50-14.00; new brass clippings, 12.50-13.00; light brass, 8.50-9.00; heavy yellow brass, 10.00-10.50; new brass rod ends, 11.50-12.00; auto radiators, unsweated, 11.00-11.50; cocks and faucets, 11.50-12.00; brass pipe, 11.50-12.00.

Lead: Heavy, 8.25-8.75; battery plates, 3.50-3.75; linotype and stereotype, 10.50-11.00; electrotype, 9.50-10.00; mixed babbitt, 10.50-11.00.

Monel: Clippings, 28.00-29.00; old sheets, 25.00-26.00; turnings, 20.00-23.00; rods, 28.00-29.00.

Nickel: Sheets and clips, 42.00-45.00; rolled anodes, 42.00-45.00; turnings, 37.00-40.00; rod ends, 42.00-45.00.

Zinc: Old zinc, 3.00-3.25; new diecast scrap, 2.75-3.00; old diecast scrap, 1.50-1.75.

REFINERS' BUYING PRICES

(Cents per pound, carlots, delivered refinery)

Aluminum: 1100 clippings, 16.00-16.25; 3003 clippings, 16.00-16.25; 6151 clippings, 15.50-16.25; 5052 clippings, 15.50-15.75; 2014 clippings, 15.00-15.75; 2017 clippings, 15.00-15.75; 2024 clippings, 15.00-15.75; mixed clippings, 14.50-14.75; old sheets, 12.25-12.50; old cast, 12.25-12.50; clean old cable (free of steel), 15.25-15.50; borings and turnings, 12.75-13.75.
Beryllium Copper: Heavy scrap, 0.020-in. and heavier, not less than 1.5% Be, 51.00; light scrap, 46.00; turnings and borings, 31.00.

Copper and Brass: No. 1 heavy copper and wire, 19.50; No. 2 heavy copper and wire, 17.50; light copper, 15.25; refinery brass (60% copper) per dry copper content, 17.25.

INGOTMAKERS' BUYING PRICES

Copper and Brass: No. 1 heavy copper and wire, 19.50; No. 2 heavy copper and wire, 17.50; light copper, 15.25; No. 1 composition borings, 16.50; No. 1 composition solids, 17.00; heavy yellow brass solids, 11.50; yellow brass turnings, 10.50; radiators, 13.00.

PLATING MATERIALS

(F.o.b. shipping point, freight allowed on quantities)

ANODES

Cadmium: Special or patented shapes, $1.70 per lb.

Copper: Flat-rolled, 41.79; oval, 40.00, 5000-10,000 lb; electrodeposited, 31.25, 2000-5000 lb lots; cast, 36.25, 5000-10,000 lb quantities.

Nickel: Depolarized, less than 100 lb, 114.25; 10-499 lb, 112.00; 500-4999 lb, 107.50; 5000-29,999 lb, 105.25; 30,000 lb, 103.00. Carbonized, deduct 3 cents a lb.

Tin: Bar or slab, less than 200 lb, 111.50; 200-499 lb, 110.00; 500-999 lb, 109.50; 1000 lb or more, 109.00.

Zinc: Balls, 17.50; flat tops, 17.50; flats, 19.25; ovals, 18.50, ton lots.

CHEMICALS

Cadmium Oxide: $1.70 per lb in 100-lb drums.
Chromic Acid: 100 lb, 33.30; 500 lb, 32.80; 2000 lb, 32.15; 5000 lb, 31.80; 10,000 lb, 31.30; f.o.b. Detroit.

Copper Cyanide: 100-200 lb, 71.60; 300-900 lb, 69.60.

Copper Sulphate: 100-1900 lb, 13.70; 2000-5900 lb, 11.70; 6000-11,900 lb, 11.45; 12,000-22,900 lb, 11.20; 23,000 lb or more, 10.70.

Nickel Chloride: Less than 400 lb, 35.00; 400-9999 lb, 33.00; 10,000 lb, 32.50.

Nickel Sulphate: 5000-22,000 lb, 33.50; 23,000-35,900 lb, 33.00; 36,000 lb or more, 32.50.

Sodium Cyanide: 100 lb, 27.60; 200 lb, 25.90; 400 lb, 22.90; 1000 lb, 21.90; f.o.b. Detroit.

Sodium Stannate: Less than 100 lb, 74.70; 100-600 lb, 65.80; 700-1900 lb, 63.00; 2000-9900 lb, 61.20; 10,000 lb or more, 59.80.

Stannous Chloride (anhydrous): Less than 25 lb, 164.10; 25 lb, 129.10; 100 lb, 114.10; 400 lb, 111.60; 5200-19,600 lb, 99.40; 20,000 lb or more, 87.20.

Stannous Sulphate: Less than 50 lb, 126.90; 50 lb, 96.90; 100-1900 lb, 94.90; 2000 lb or more, 92.90.

Zinc Cyanide: 100-200 lb, 59.00; 300-900 lb, 57.00.

(*Concluded from Page 197*)

Despite fabricators' concern over backlogs, there is more work on architects' boards, and inquiry is improving. Public work is the most active.

In the East, inquiry is more active despite disappointing volume in Pennsylvania State bridge work. In New England, slightly more bridge work is being estimated. School jobs also are coming out there.

Under the "lease-purchase" program, an estimated 50 federal buildings of the 150 approved (costing $725 million) will go ahead this year. The Post Office Department and the General Services Administration are involved.

Requirements for the federal road-building program and other highway work will involve less tonnage than originally estimated. Interstate projects will need not over 800,000 tons, and other highways 1,630,000 tons. The figures include all types of steel, and run about 20 per cent over 1957 tonnage.

Fabricators' steel inventories are heavy. In many cases, users took in all the tonnage due them on orders after supplies eased. Their storage yards are well filled. Still, though plain material delivery promises are relatively easy, they are not as easy as most other tonnage steel items.

The Bethlehem Steel Co. is taking advantage of the lull to repair its 48 in. wide flange mill at Bethlehem, Pa. Operations were suspended Feb. 15 and will be resumed Mar. 10.

STRUCTURAL SHAPES . . .

STRUCTURAL STEEL PLACED

1200 tons, transmission towers, Priest Rapids power project, to Bethlehem Pacific Coast Steel Corp., Seattle.

1000 tons, shopping center, Hyattsville, Md., to Schacht Steel Construction Inc., New York.

940 tons, state highway bridge, Jenkintown, Pa., through F. A. Canuso & Sons, Philadelphia, general contractor, to Bethlehem Steel Co., Bethlehem, Pa.

610 tons, Bond Brook and Mt. Vernon Avenue bridges, Augusta, Maine, to Bancroft & Martin Rolling Mills Co., South Portland, Maine; Ellis C. Snodgrass Inc., Portland, Maine, general contractor.

250 tons, addition, Lawrence Memorial Hospital, New London, Conn., to Topper & Griggs (Bethlehem Fabricators Inc.), West Hartford, Conn.; W. J. Megin Inc., Naugatuck, Conn., general contractor.

250 tons, subway pass, Senate Bldg., Washington, to Belmont Iron Works, Eddystone, Pa.

175 tons, boiler supports, 1 and 2, Potomac Electric Power Co., Dickerson, Md., through the Combustion Engineering Inc., New York, to the Bethlehem Steel Co., Bethlehem, Pa.

STRUCTURAL STEEL PENDING

10,500 tons, galvanized steel towers, bids March 11, Bureau of Reclamation, Denver;

CHIEF PRODUCTION ENGINEER

To take complete charge of Production Engineering Department of progressive alloy fabrication plant located in western New York. Must be thoroughly experienced in the fabrication of alloy equipment, particularly reactors, columns, heat exchangers, etc. Complete understanding of ASME code regulations as applied to pressure vessels necessary. Position involves the supervision of 35 to 40 persons and responsibility of all Production Engineering work in the Division. Applicant must have at least a ME Degree with a minimum of 10 years engineering experience in the fabricating field. An important factor in the final selection of the candidate will be proven administrative ability. Age bracket 35 to 45. Please answer to Box 637, STEEL, Penton Bldg., Cleveland 13, Ohio, giving all pertinent information. Replies held confidential.

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WANTED — CRANE

25 to 40 ton standard gauge diesel powered locomotive crane. Will consider steam or converted unit. Advise full details.

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EQUITABLE EQUIPMENT CO., INC.
410 Camp St. New Orleans 12, La.

CLASSIFIED

Help Wanted

SALES ENGINEER

Long established and well known eastern Forge Shop and Steel Foundry specializing in open die forgings and heavy steel castings desires to employ Sales Engineer for Eastern District Office. Applicant should be between the ages of 27 and 35, college education preferred and with some sales experience in forging and casting industry or allied fields. Successful applicant for this very desirable position will be given several months training at plant before assuming position in the field. Write Box No. 634, STEEL, Penton Bldg., Cleveland 13, Ohio.

Positions Wanted

POSITION WANTED: With aggressive ornamental iron, aluminum and stainless steel fabricator; capable of assuming complete charge of and co-ordinating sales, estimating and engineering departments in the above metals or structural steel. Thirty years continuous experience with top companies. Age 50 years, neat appearance and good health. Could be available in 60 days. Write Box 638, STEEL, Penton Bldg., Cleveland 13, Ohio.

CLASSIFIED RATES

All classifications other than "Positions Wanted" set solid, 50 words or less $15.00, each additional word .30; all capitals, 50 words or less $19.20, each additional word .38; all capitals leaded, 50 words or less $23.40, each additional word .47. "Positions Wanted" set solid, 25 words or less $3.60, each additional word .14, all capitals, 25 words or less $4.50, each additional word .18; all capital leaded, 25 words or less $5.40, each additional word .22. Keyed address takes seven words. Cash with order necessary on "Positions Wanted" advertisements. Replies forwarded without charge. Displayed classified rates on request. Address your copy and instructions to STEEL, Penton Building, Cleveland 13, Ohio.

also, 180 tons of stub angles.

10,400 tons, 309-mile transmission line, Ft. Peck, Mont., to Bismarck, N. Dak; bids to Bureau of Reclamation, Denver, March 11.

5000 tons, Delair vertical span, Pennsylvania Railroad, Philadelphia; American Bridge Div., U. S. Steel Corp., Pittsburgh, low bidder.

2870 tons, state bridge work, PSC-TC 3518, Queens County, New York, Horne Construction Co., that city, low on general contract.

2000 tons, PSC 7278, bridge work, Nassau County, New York, Hendrickson Bros. Inc., Long Island City, N. Y., low on general contract.

2000 tons, patients building, state hospital, Ward's Island, New York, bids Feb. 20.

1960 tons, Nassau County office, New York, J. T. Brady & Co. Inc., New York, low on the general contract.

1440 tons, state bridge work, FISH 58-24, Saratoga County, New York, Rute Bros. Inc., low on the general contract.

1100 tons, Darling Towers Apartment, Wilmington, Del.; project revised.

520 tons, four state bridges, Cummington, Mass.; Warner Bros. Inc., Sunderland, Mass., general contractor.

600 tons, three-span continuous welded, deck girder bridge, Hamlet Avenue, Woonsocket, R. I., bids Feb. 19, Providence, R. I.; also, 120 tons, steel H piling, and 110 tons, concrete reinforcing bars.

500 tons, maintenance shop, Camp Kilmer, New Brunswick, N. J.; bids opened Feb. 13 following a postponement.

316 tons, Washington state, Naches River truss bridge; general contract to Walter G. Meyers & Sons, Spokane, Wash., low at $203,755.

190 tons, Little Androscoggin River Bridge, Auburn, Maine; bids Feb. 19, Augusta, Maine; also, 3125 linear ft steel H-beam piling, and 490 linear ft aluminum rail.

WE OWN and OFFER FOR SALE
OVERHEAD CRANES

CAPACITY		NAME	SPAN	LIFT
10		Shaw	47′	15′
15		Shaw	67′	26′
150	**	N B P	75′	40′
20	*	N B P	71′ 10″	25′ 6″
150	**	Shepard Niles	100′	39′
40	***	Harnischfeger	98′ 10″	40′ 8″
20	*	Shepard Niles	98′ 10″	27′
20	*	Shaw	96′	27′
20	*	Shepard Niles	96′	28′
20	*	Shepard Niles	96′	26′
50	****	Shepard Niles	100′ 6″	25′
20	*	P & H	100′ 6″	24′ 9″

* 20 T. bridge with (2) 10 T. trolleys
** 150 T. bridge with only (1) 75 T. trolley (add'l. 75 T. trolleys may be available)
*** 40 T. bridge with (2) 20 T. trolleys
**** 50 T. bridge with (2) 25 T. trolleys

10		Niles	64′ 8″	23′
10		Shaw	64′ 8″	22′
10		N B P	52′	19′
10		P & H	52′	19′
75	†	Shaw	75′	36′

† 150 T. bridge with only (1) 75 T. trolley which has 10 t. auxiliary

All cranes 250 Volts—D.C.

ALL IN EXCELLENT OPERATING CONDITION
MAY BE INSPECTED IN OPERATION
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We also offer 2000′ each of 24″ and 43½″ Crane Runways in 18′ lengths, with columns

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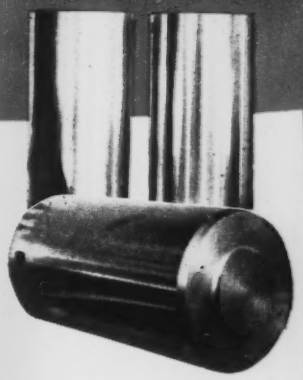
Hyde Park RAMS



for all types of HYDRAULIC EQUIPMENT

Hyde Park Rams are available in Chilled or Alloy Iron.

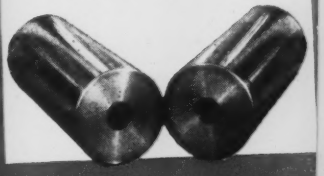
Furnished in hardness range to meet your specification . . . ground to your required size.

On your next replacement of Rams—or for new equipment—consult us. Our engineers will be glad to assist you.

Red Circle Rolls for every Purpose

Rolling Mill Equipment

Gray Iron Castings up to 80,000 lb.



Hyde Park

FOUNDRY & MACHINE CO.

Hyde Park, Westmoreland Co., Pa.

ROLLS

ROLLING MILL MACHINERY

GRAY IRON CASTINGS

Bethlehem High-Strength Bolts join structural members in new home of Chicago Sun-Times. *Owner:* Field Enterprises, Inc.; *Architects-Engineers:* Naess and Murphy; General Contractor: George A. Fuller Company.

Newsplant in Chicago has high-strength bolting

The new home of the Chicago Sun-Times is one of the most modern newspaper plants in the country. The aluminum curtain wall structure, on the north bank of the Chicago River, is nine stories high, and has a penthouse. Its total floor area is approximately ten acres.

The erection of the 6,400 tons of steel framework for this attractive building proceeded smoothly and quietly, using thousands of Bethlehem High-Strength Bolts to connect the structural members.

Bethlehem High-Strength Bolts save time in erecting steelwork because they can be installed quickly by means of a pneumatic impact wrench and holding wrench. Each bolt is used with two hardened washers, one placed under the head, the other under the nut. With this method, tight, sound joints are possible in a matter of seconds.

OTHER ADVANTAGES OF HIGH-STRENGTH BOLTS

High-strength bolting, a much quieter form of construction than riveting, is highly desirable for school and hospital zones. And since the bolts are installed cold, there is no fire hazard involved. Moreover, where power tools are unavailable, the bolts can be tightened with hand spanners.

Bethlehem High-Strength Bolts are made of carbon steel in popular sizes, and are quenched and tempered to meet the requirements of ASTM Specification A-325. For full details, get in touch with the nearest Bethlehem sales office.

BETHLEHEM STEEL COMPANY, BETHLEHEM, PA.

On the Pacific Coast Bethlehem products are sold by Bethlehem Pacific Coast Steel Corporation. *Export Distributor:* Bethlehem Steel Export Corporation

BETHLEHEM STEEL

BETHLEHEM STEEL

Clevelands drive cooling bed of highly automated Canadian tube mill

Here is the cooling bed—driven by 3 Cleveland speed reducers—of the world's first completely automated seamless tube mill. It was built by Mannesmann-Meer Engineering & Construction Co., Inc., Easton, Pa., and installed at the Sault Ste. Marie plant of Mannesmann Tube Company.

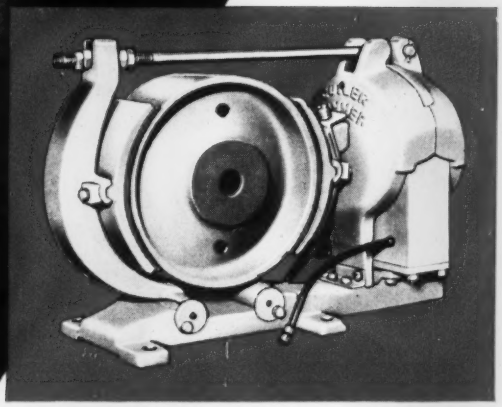
Practically everything in the entire plant is automatic—handling of materials from stage to stage, as well as individual operations.

You'll find Clevelands in nearly every steel plant in America—wherever dependable, heavy duty drives are demanded—many of them in continuous service upward of 35 years. Write for new Bulletin 145 which shows the many types available in the Cleveland line. The Cleveland Worm and Gear Company, 3270 East 80th Street, Cleveland 4, Ohio.

CLEVELAND
Worm Gear
Speed Reducers

Affiliate: The Farval Corporation, Centralized Systems of Lubrication.
In Canada: Peacock Brothers Limited.

The Cutler-Hammer 505 Mill Brake can be adjusted perfectly in total darkness



Mill brakes are often installed in hard-to-reach places where there is very little light. Yet, as every mill man knows, they must be kept adjusted for lining wear. This is no problem when the brake is a Cutler-Hammer 505! It can be adjusted perfectly in total darkness.

A man doesn't need a flashlight . . . or a third hand to hold one . . . when adjusting a Cutler-Hammer 505 Brake. With one hand he turns the adjusting nut and with the other hand he simply *feels* the indicating pins. When these pins are flush with their housing, the brake shoes are in *perfect* adjustment. There are no scales to read, nothing to measure, no tedious testing or climbing up and down for readjustments.

Compare the Cutler-Hammer 505 Mill Brake with any others. The biggest users of magnetic brakes say the 505 has no equal . . . in design, in construction, and in performance. Compare and prove it. CUTLER-HAMMER Inc., 1211 St. Paul Ave., Milwaukee 1, Wisconsin. Associate: Canadian Cutler-Hammer Ltd., Toronto.

Why Mill Men Prefer the Cutler-Hammer 505

Only ten major components; the ultimate in simplicity.

Over-the-wheel pull rod avoids clutter and trouble of complex linkage systems.

Single capsule operating coil easily accessible; reversible to put leads on either side.

Shoes can be adjusted perfectly in total darkness by simply feeling the positions of indicating pins.

Single torque spring means only one torque adjustment.

Nuts for all adjustments are above the center line of the motor shaft; nothing is buried or hard to reach.

CUTLER-HAMMER
MOTOR CONTROL
C-H